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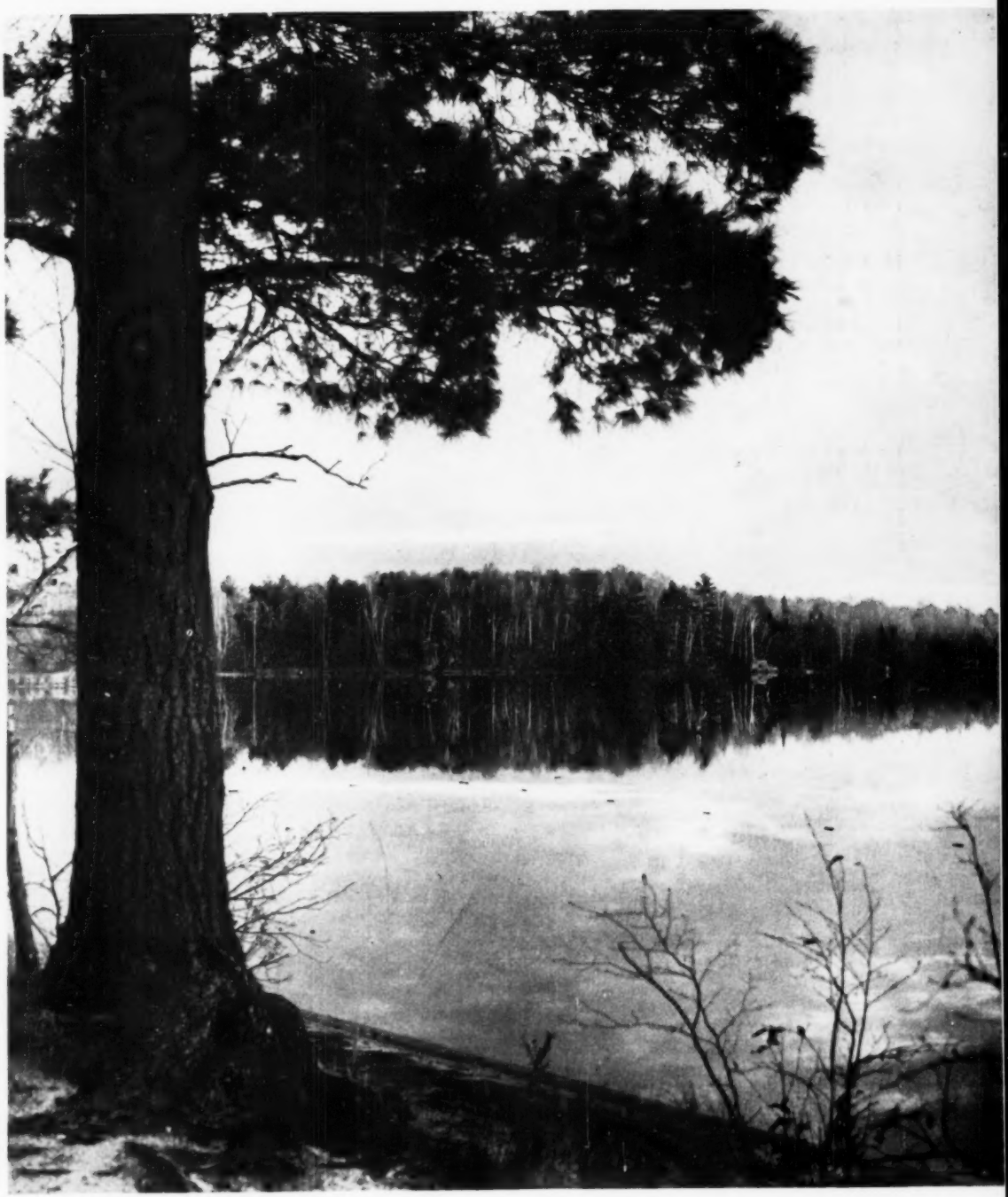

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Large-Scale Tests in Silvicultural Research[1]

Carl E. Ostrom and
Svend O. Heiberg
S.A.F. Division of Silviculture[1]

FOR THE PURPOSE of this report, a large-scale test is one in which the treatments are applied on a practical or semi-practical scale on relatively large areas (usually 10 to 100 or more acres), as distinguished from the conventional small sample plots.

Many agencies are using large-scale tests as one technique in silvicultural research. In fact such tests are probably used on a majority of the active research and demonstration forests in the United States. The committee has not made a study of the extent of such tests nor of the variation in techniques employed in all parts of the country.

This report does attempt to set forth the place of such tests in silvicultural research, and to provide guide lines on methodology, particularly concerning troublesome points where some guidance may be helpful. The report draws on an earlier statement by Dr. George M. Jemison (*1*), adding conclusions from recent experience with large-scale tests on a half-dozen experimental forests in the Southeast, and on other experimental forests elsewhere.

The subcommittee is indebted to a number of research foresters who reviewed the first draft of the report and contributed ideas to it.

Why Large-Scale Tests

One can scarcely discuss large-scale tests in silvicultural research without getting involved in the deep-seated controversy on the relative merits of fundamental and applied studies that pervades all research. Large-scale tests have their advantages and disadvantages, their enthusiasts and detractors. Perhaps we can best begin by stating those conditions under which such tests seem necessary or desirable.

As a general premise, large-scale tests are needed where the subject material of the experiment, the treatment applied, or the results expected are related to or affected by the size of the individual land units used in the test. An example of a large-scale test dictated by the subject material of the experiment would be a study involving a stand pattern which cannot be compressed onto a small plot. One such pattern is a group-selection forest with sizeable individual groups. This method and some others require careful attention to the manipulation and regulation of growing stock, an issue which is beyond the scope of most small-plot studies.

Large-scale tests are required by the nature of the treatment when applying certain area-wise cultural measures, such as the use of prescribed fire when it is an integral part of the management system. All indications point to an increase in the use of area-wise treatments permitted by new developments in the field of mechanical equipment, fire, and chemicals.

Large-scale tests involving logging costs are examples of studies in which the results to be measured are affected by the size of the area used in the test. Often a comparison of management systems includes a comparison of representative logging costs as a major element in the test. Such costs can sometimes be synthesized from special studies, or obtained by action agencies on current operations. In such cases the collection of cost records is not necessarily a justification for the expense of installing large-scale tests in silvicultural research. Under different circumstances, the need for comparative cost data might be a major reason for conducting tests on a semi-practical scale. Many foresters favor large-scale tests because they do combine biological and economic phases in a single trial.

In a few unique instances, it is physically impossible to perform the intended type of study except on a naturally occurring land unit. One example is the comparison of the effect of forest land management systems on the level and pattern of streamflow. Such a study requires a watershed or portion thereof as a test area.

There are two subsidiary benefits from large-scale tests which affect their value in research. Experience has shown that once a set of compartments has been established and placed under management by various systems, these areas provide valuable opportunities for supplementary studies of more restricted silvicultural questions. For example, some excellent studies of the detailed chain of events controlling regeneration of loblolly pine in Virginia and Arkansas were conducted on large-scale compartment tests of management systems. A second subsidiary benefit of large-scale tests is that they tend to feed back to the research man or silviculturist a new set of problems arising from the testing of purely silvicultural concepts on a sizeable scale.

[1]Report of the Subcommittee on Large-Scale Tests, Committee on Technical Procedures and Standards for Silvicultural Research and Research Publication, Division of Silviculture, Society of American Foresters. Dr. Ostrom, *Chairman*.

Many proponents of large-scale tests feel that these tests are essential in order to take the risk out of recommendations synthesized from small or short-term tests. These proponents also feel that expensive mistakes can be made by the adding up of piecemeal results of small tests into recommendations for a management system without testing the system on an adequate scale. This is particularly true where the land management system involves integrating such things as grazing, timber production, and prescribed burning.

From a research standpoint, large-scale tests have some definite disadvantages. Unless the minimum size of unit is used that will serve the objective of the experiment, money may be wasted. Large-scale tests are generally, but not necessarily, long-time tests. As such, they require assurance of continuity of funds. They involve risk of loss through obsolescence or catastrophe, and restrict the flexibility of a research program. Large-scale tests also tend to involve a considerable amount of routine work in cruising, marking, scaling, and computing, which may detract time and effort from original and creative research in unexplored fields. They require a degree of teamwork and planning which may be lacking in a research group for one reason or another. And unless the conditions of the experiment are carefully recorded and interpreted, such tests may fail to provide principles that have broad application to other conditions.

Finally, those who are accustomed to well-controlled and definitive tests of specific questions object to the loss of experimental control that ordinarily goes with a test of management systems on large areas. This loss is illustrated best by the great expense of replicating large-scale tests in sufficient numbers to provide a valid test of the significance of differences in quantitative results such as timber yield.

As the foregoing discussion implies, the important thing is to put large-scale tests in proper balance with small-scale and special studies. To find the combination to get the maximum quantity of reliable and convincing results in the minimum time, is one of the most difficult problems facing a research agency.

So far, this discussion has been limited to the research aspects of the question, "Why Large-Scale Tests?" The demonstrational and educational value of large-scale tests compared to small plot studies is widely recognized. Large-scale tests can be an important factor in getting the results of research into practice and in raising the general level of forest management in an area where it is lagging. The extent to which this demonstration objective should influence a program of research depends on the local need and on the policy of the research organization.

The purpose of the remainder of this report is to provide some guide lines to the conduct of large-scale tests where the need for such tests has been determined.

Types of Large-Scale Tests

Large-scale tests of silvicultural treatments and systems may take the form of comparative or non-comparative research. The latter type would consist of a true pilot-plant application of an agreed management policy on a particular unit of perhaps several hundred acres or more. It is ordinarily preceded by reliable and conclusive comparative tests on a smaller scale. The research objectives, though real, are more difficult to pin-point than in comparative research in which several alternatives are tested. The research objective might be to work out the details of technique of application to a representative mixture of stands. Where the land management is complex, a pilot-plant test may serve to reveal the problems of integrating the recommendations of specialists in such fields as timber, water, range, and fire.

The simulated farm woodland tracts of about 40 acres each, now installed on many experimental forests, are miniature pilot-plant management areas of high utility, though as much for demonstration as for research. They also provide an excellent opportunity for the research forester to bring to bear all of his silvicultural knowledge in meeting the various stand conditions encountered on a given tract.

The comparative type of large-scale test is the more generally useful and the more complex to operate. Furthermore, most of the research values obtainable from a pilot-plant test of a single method can be obtained from a comparative test of several methods. For these reasons, the remainder of this report will concern the comparative testing of several management alternatives or systems.

Comparative Tests of Management Systems

Type of Area Required

An experimental forest area for the conduct of compartment comparisons of management systems should be representative of the major types and stand conditions in the region to which the results will apply. The research area should not have predominantly poorer than average stand conditions for the region, or progress is apt to be relatively slow. On the other hand, the site quality should not be exceptional, or the results will be discounted as inapplicable. Average stands on average sites have the advantage that the results will be most convincing to the practitioner. At the same time there is also an advantage in starting with somewhat better than average stand conditions on average sites in depleted regions. The advantage lies in the fact that the results, which are slow enough in materializing, may then be more useful in showing potentialities under good management. Obsolescence in long-time research due to current changes in equipment, methods, and markets is enough of a problem in itself. The research forester can often afford to have a little head start in respect to stand conditions, in order that his

results will be ahead of current practice when they become available.

A balance or variety of age classes is frequently a real advantage in initiating a comparison of management systems. It permits research on a greater variety of the problems attending the application of each system in stands of different ages, and an earlier summarization of the results as applied to a complete rotation. A lack of merchantable age classes on the experimental area is obviously a serious handicap in this respect.

The forest should be as accessible as possible to main routes of travel. It has been said that the demonstrational aspects of such studies, though not the most important, are the most conspicuous. They should be capitalized on with a view to getting the results into use.

Subdivision of the Area

In large-scale tests, the unit of comparison is a block of land (compartment) usually larger than 10 acres in size. In a single, extensive forest type on level land, compartments can best be square or roughly square in shape to minimize border effects. In rough topography, compartments should correspond to natural logging units in order to provide representative logging costs insofar as possible.

In pine timber in level country, compartments about 40 acres in size have been found satisfactory. This size gives a reasonable idea of logging costs, and is none too large silviculturally for such treatments as group selection or seed-tree strip cuttings in tall, light-seeded species. Installations on small plots in young stands are frequently found to be too small as the timber matures and the regeneration period approaches.

On accessible land with a mixture of forest types, but where topography is not rough enough to dictate the logging units, compartments for large-scale tests will often be defined by stand and type boundaries. On the Pack Forest in New York, there are small stands valued at one to two thousand dollars per acre which justify treatment as permanent management units. On this forest, the compartments range from 2.3 to 60.6 acres in area.

In rough topography, compartments of larger size may be needed, either to fit natural logging units, to provide representative costs, or to avoid insufficient width across the narrowest dimension of an irregular compartment. Fortunately, cutting cycles are usually longer in rough than in flat country, permitting the same size of research staff to operate the larger compartments with no greater long-time work load.

In level country, it is possible to lay out compartments so that they are reasonably homogeneous with respect to forest type, stand condition, and site quality; this should be done where feasible. In the mountains, several of these conditions are so closely related to topography that much heterogeneity within compartments must be accepted. However, this lack of uniformity can usually be separated out in the silvicultural record by subdividing the compartments along forest-type or condition-class boundaries. In the Appalachians, for example, the same four or five major forest types tend to occur in most of the topographic logging units (compartments).

In flat country, subdivision of compartments is not always essential, but is usually desirable. The subcompartments generally differ from each other in starting conditions or in some other factor which may help to explain differences in silvicultural results. On the Hitchiti Experimental Forest in the Georgia Piedmont, subcompartment records have provided very good interim data on growth in relation to starting conditions, and on the effectiveness and cost of various cultural practices. Subcompartment records also improve the chances of recovering sound data in the event of catastrophe in part of the stand. Only in flat country with very uniform timber might it be questionable whether the value of subcompartment records justified the cost of maintaining the subcompartment boundaries and the added burden of office work.

Selection of Treatments

A long-time compartment test of management systems will largely stand or fall on the proper selection of the highest priority comparisons to be made in the test. Generally the results of earlier research will be available for guidance. To select the most profitable treatment comparisons with realistic foresight but without personal bias requires real skill and judgment. The following are some of the major classes of compartment treatments that can be used in varying combinations.

1. Silvicultural system of stand management and regeneration.
2. Product objective (small products, large high-quality products) or rotation.
3. Intensity of cultural treatment and length of cutting cycle.
4. Volume of residual growing stock.

A common design for a large-scale test is to use several silvicultural systems with two different product objectives. A further division with respect to cutting cycle, growing-stock level, or cultural treatments may be added. Variation in product objective provides some degree of insurance against future changes in utilization practice. Provision for a difference in cultural treatment may help to anticipate new techniques which have a habit of changing our management in the direction of higher intensity. In any event, bias in the application of more intensive cultural practices to one silvicultural system than to another must be avoided, unless this bias is clearly recognized in the objectives of the study.

Compartments can be split with respect to certain minor treatment differences such as timber stand improvement measures. But if carried to excess, the practice of superimposing more and more treatments on different portions of each compartment will more than likely defeat some of the original purposes of using large test units.

Assignment of Treatments

While recognizing the value of the principle of randomization, not all foresters agree that it is strictly applicable to the assignment of treatments to compartments in large-scale comparisons of management systems. Random assignment of treatments seems acceptable where the timber is relatively uniform or where the number of replications is ample. Where few replications must be assigned to variable timber, it is argued that many years can be saved by purposeful or selective assignment of treatments to certain compartments to which they are best adapted. For example, group selection might be assigned to the more patchy stands, and long rotation or large-product objective might be assigned to the compartments with predominantly older timber. An obvious pitfall of non-random assignments is the fact that apparently superficial differences in age or uniformity of timber may be associated in known or unknown ways with basic differences in soil or site. Furthermore, a given system will give different results when applied late in the life of a stand than when it is applied early. Thus the evident advantages of non-random assignment must be weighed against the less evident risks in any individual case. Often the compartments can first be grouped with respect to basic differences in site and age, and then the treatments can be assigned to equal numbers of compartments in each group. Careful attention to the assignment of treatments should avoid the danger of ascribing to treatment certain results which may in fact be due to differences in site quality or other starting conditions.

Application of Treatments

Several definite choices await the manager when he applies an assigned management system to a given compartment. Should he rapidly force the stand into the required form at a financial sacrifice in order to get his silvicultural comparison started as soon as possible? Or should he use only economic and profitable methods of conversion, taking a longer time to get the ideal form of stand required by the particular system? This choice must be made in light of the objectives of the study. If information on the most profitable method of conversion to the desired form of forest is sought, then the second alternative will be chosen. If the emphasis is on the silvical adaptability of a species to a given form of forest, the first and more drastic alternative will speed up the test. Often a reasonable compromise will be selected in which, for example, immature timber in one corner of a mature compartment would be clear cut along with the older timber to provide uniformity of age class in the next rotation.

Where it is realistic to do so, an attempt should be made to eliminate differences in stand condition between subcompartments in successive cuts, so that logging costs and other results for the compartment as a whole will be more meaningful.

The attainment of sustained yield on a research area devoted mainly to a compartment comparison of different silvicultural treatments is usually beside the point. Nevertheless, it is desirable to schedule the cuts so that no one period will have an excessive work load after the transitional and formative cuts have been taken care of.

The Collection of Records

The collection of records on large-scale compartment tests is a big subject (*2*), and only the highlights can be treated here. Ordinarily a decision must be made between the use of a 100-percent inventory or a sampling method. A ready compromise is to inventory the larger timber 100 percent, perhaps in conjunction with the marking, and to record the smaller trees and reproduction on a sampling basis. Sampling the larger timber by the establishment of permanent sample plots is likely, in variable timber, to result in an increase rather than a decrease in costs when the time required for plot maintenance and the summarization of individual plot records is taken into account. In more uniform timber, where fewer sample plots will give sufficient accuracy, the sample plots are apt to be more efficient than a complete inventory.

Some subdivision of the inventory, either by sample plots or by subcompartments or both, is likely to increase the research value of the data. Such subdivision will permit closer study of the relationship of growth and yield to starting condition, stand density, site, or other factors.

It is generally agreed that the basic record of yield in a longtime comparative test is best determined from inventory records of standing trees, inasmuch as the scale of products utilized will vary with time and place according to current utilization practice. At the same time, an additional records of the volume actually utilized is often needed for interpretation of extraction costs. Such a record also shows trends in utilization practice.

The value of logging costs obtained from compartment comparisons of management systems in contrast to those obtained from well-controlled special logging-cost studies is debatable. Probably both approaches are valuable. In the absence of good cost data from other sources, it seems advisable to keep logging costs on compartment areas along with a record of weather conditions, equipment used, and other circumstances affecting the operation. Over a period of time, these experience records for different management systems may be a valuable supplement to special studies in which more of the variables affecting cost are under definite control.

Collection of data on the cost of management must be done realistically with a view to its application to other ownerships. A record of time devoted to inventory, marking, and similar operations on a compartment research area may unavoidably be so intermingled with research costs as to have restricted application to practice. For

example, tree grading may be added to the inventory to make the research record more valuable. In this event, more realistic data on inventory costs might be collected from nearby commercial operations. Miscellaneous costs of management that have no relation to the systems under test can usually be collected from outside sources at the time that a complete financial comparison is to be made.

Among the most useful of all records provided by large-scale tests are time and cost data for various stand improvement measures and cultural practices. Realistic costs for area treatments such as machine scarification and prescribed burning cannot be obtained except from large-scale tests. The costs and results of intensive cultural practices are among the earliest interim results available from many large-scale tests of management systems in regions where intensive management is practicable. The active collection and use of interim data on growth, cultural practices, regeneration, silvical reactions, and other phenomena is a test of the manager's ability to make the most effective use of large-scale tests. It is also the best insurance against the hazards of obsolescence and catastrophe which threaten long-time tests of any type.

Interpretation of Results

A conception of the proposed interpretation of the results is essential before a large-scale test of management systems is installed. The most clear-cut type of result is the silvicultural success of the method, particularly with respect to regeneration. This success will usually vary further according to the size of product grown and the intensity of management.

Theoretically, the net profit over a rotation and the timing of the income will also be important results of the test. However, the vagaries of circumstance and the exact way in which the system is applied may make refined comparisons of net returns impossible or misleading. But refined comparisons may not be needed. It is more likely that the most valuable result of such tests will be a multitude of interim findings on all manner of silvicultural questions, and a determination of the many advantages and disadvantages of each system at various stages of development. From this information, it should be possible for the researcher, the landowner, or the industrialist to conclude which system is the best choice for a specified set of management objectives and operating conditions.

Large-scale tests are no panacea. But properly conducted, and amply supported by an active program of basic and special studies, a comprehensive large-scale test should lead to a comprehensive array of useful inferences.

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OFFICERS AND MEMBERS OF THE COUNCIL at Ann Arbor, Mich., June 13-15, 1954. *L* to *R*, Stanley G. Fontanna, J. S. Illick, C. Huxley Coulter, R. H. Westveld, Vice President DeWitt Nelson, P. D. Hanson, President E. L. Demmon, Executive Secretary Henry Clepper, J. Herbert Stone, E. F. Heacox, and William J. Brown. Absent, D. B. Demeritt.

Photo by University of Michigan News Service

For a report of the Council meeting see page 619

The Control Method of Forest Management in an Age of Aerial Photography[1]

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THERE ARE THREE ideas that have been of great importance in the field of forest management. The purpose of this paper is to trace the development of these ideas and to show a practical way they can be used in making forest-management plans for timber production.

The Methode Du Controle

The *methode du controle* was first proposed by Adolphe Gurnaud, who was born in 1825 at Besancon, France. Gurnaud was a dissenter who urged that forest management should be used as a means of controlling silvicultural measures. He urged the reduction of growing stock on the French state forests. He also opposed the then current official views on thinning methods and forest management.

In 1878 Gurnaud (*17*) published his method of controlling the growing stock and cut by repeated inventories. In simplest form this method involves: (1) measuring and remeasuring the diameters of the standing trees above a certain minimum size; (2) measuring the size and volume of all felled trees in the same way as that of the standing trees; (3) measuring trees that grow into the smallest size class (ingrowth) at the time of each new inventory; and (4) computing tree volumes by the use of local cubic volume tables in order to obtain comparable results from each inventory.

Gurnaud had already been struck from the list of French state foresters in 1866 and was managing several communal forests in the Jura region of the French Alps when he published his famous method of control. It was on these communal forests that he tried to put his ideas into practice. The conditions were unfavorable and he had poor success.

The development of this method was carried forward by Henri Biolley (1858-1939) in Switzerland (*4, 5, 6, 7*). Biolley successfully introduced this form of management into some communal forests in 1890 and later into the whole Canton of Neuchatel. He lived to see the principles of the *methode du controle* accepted in Switzerland as correct and increasingly followed in practice.

The pros and cons of keeping records by the control or continuous-inventory method have been widely debated by foresters for the last 75 years. Conditions in the mountain terrain and conifer forests of Switzerland have favored this system as used in selection forests. But there have been many doubts about applying it in other areas where even-aged silvicultural systems are now in operation.

It is unfortunate that this mensurational method of recording the gross increment and controlling the cut and stand structure of a forest area should be confused with and thought to be part and parcel of various new ideas of silviculture, which are variously named *Dauerwald* (continuous forest), *Plenterwald* (selection forest), and *Methode du jardinage* (single-tree method), which arose about the same time.

According to Knuchel (*24*), "The use of control method is not limited to selection forest. It is applicable in every type of forest, except where clear cutting is practiced, when it would be meaningless. In any case working control must be adapted to suit the treatment of the forest, and not the other way round."

One can readily see, then, that the control method works best and has its widest application in the irregular, uneven-aged selection-type forests impossible to manage by the traditional method of periodic fellings and so-called normal age-class distribution. Hence the mistaken belief of many foresters that they must convert their stands to the all-aged condition before the control method is applicable.

Where the older methods of management fail, the control method provides the forest manager with current data on the amount and distribution of his growing stock, the increment or production situation, and the effect of various cultural or harvest cutting measures. But the method is not limited by the type of forest or the silvicultural methods employed in regeneration or harvesting—provided partial and not widespread clear fellings are practiced.

Before leaving the control method, I should mention some of the significant publications on this subject in addition to those already cited. It would be impossible to list all the various publications dealing with growth and management of irregular stands. Much of the literature prior to 1941 is included in the 146 references listed by Wahlenberg (*46*). H. Arthur Meyer (*28*) gives 21 titles on forest growth determination in his excellent publication on this subject. Knuchel (*24*) presents 32 references, all by European authors, in his interesting discussion of "Management control in selection forest."

Another work of great merit is that of the late R. Bourne (*8*), entitled "A fallacy in the theory of growing stock." Starting in 1924, certain beechwoods in the Chiltern Hills of England have been converted gradually to the all-aged selection form, as checked by continuous-inventory measurements. This is, as far as is known, the only example of the *methode du controle* in England at present (1950). Bourne lists 10 references.

Dannecker (*10, 11, 12*) urged the use of the control method of forest management in Germany. He likened it to the modern concept in the economics of agriculture known as "production control," which aims at record-keeping to continuously improve pro-

[1]Presented at the annual meeting, Society of American Foresters, Colorado Springs, Colo., September 1953.

duction for greater financial returns.

In the United States, Burt Kirkland (*20, 21, 22, 23*), was one of the first to advocate use of the method of control or continuous-inventory system and tree-selection logging, especially for the remaining old-growth forests of the Pacific Northwest. His thought influenced the conduct of experimental-forest management at Crossett, Arkansas (*33, 39*), and elsewhere.

H. A. Meyer (*25, 26, 27, 28, 29, 30, 31, 32*) has also explained and worked out the local application of the method of control and other methods of growth determination in Switzerland, Mexico, and the United States.

Osborne (*37*) was one of the first to adapt this method to the forest survey of large or state-wide areas in the United States. Holt (*18*) has translated an article by Alfred Huber of Switzerland for the information of the Canadian pulp and paper industry.

Stand Structure

The use of stand structure (or the stand graph showing diameter distribution of a forest area) as a tool of forest management was suggested by Gurnaud in 1878, but it was little used until 1890, when Biolley revived it.

In the early stages, less attention was paid to the relationships between individual diameter classes. The number of trees by size classes was used chiefly to get volume data, which in turn were summarized by three broad size groups: small, medium, and large trees. In 1898 de Liocourt discovered that the stand graph of selection forests of fir in the Vosges region of France was of a typical inversed J-shaped form, and that the number of trees in successive diameter classes, from largest to smallest, represented a geometric progression (*13*).

Later studies have shown that a diameter distribution of this inversed J-shape may be plotted as a straight line on semi-logarithmic paper. This procedure facilitates analysis and application in studies of stand structure and forest regulation (*26, 39*).

Important publications on stand structure are those of Flury (*14*), Vaulot (*45*), d'Alverney (*1*), Schaeffer, Gazin, and d'Alverney (*40*), and Francois (*15*). Hough (*19*), used diameter-distribution data for the special purpose of determining the history of virgin white pine development in Pennsylvania. Smithers (*41, 42*) used cumulated stand-distribution data from periodic inventories of sample plots as a method of determining the periodic diameter increment for each diameter class of Canadian stands.

As shown by Meyer (*30*), the diameter distribution of any large forest area tends towards the inversed J-shape. This is true not only in well-managed selection forests and in most virgin forests, "but in any large forest area which contains a reasonable amount of pole timber and light and heavy saw timber, such as is the case with the forests of an entire county or state."

A characteristic of such exponential curves is that the ratio or quotient between the number of trees in successive diameter classes is a constant value. The numerical values of this constant "q" show a wide range, depending on the character of the stand as to relative stand density, forest type, site, and factors of management.

The application of these relationships to the computation of (1) desired growing stock, (2) gross volume increase by diameter classes, and (3) the estimation of allowable cut has been outlined by Meyer (*30*) for balanced uneven-aged forests.

Forest-Survey Methods

The Canadians, working with vast coniferous pulp-producing forests dotted with lakes, first became adept at delineating forest types from the air using seaplanes (*47*). Today we use aerial photography for mapping land-use areas, land and property lines, streams, roads, culture, forest cover types, soil and site maps; and for delineating forest stand-size and density or volume classes of timber.

Stephen Spurr (*43*) covers this growing use of aerial photography in forestry and gives a good bibliography. Moessner (*34, 35*) sketches the value of aerial photographs to the forest manager and methods of photo-classification for forest sites. Similar ideas are outlined for the classification of wildlife cover types by Wilson and Berard (*48*).

Admittedly aerial photographs are quite valuable to the forest-land manager. But how are they best used in preparation of management plans for timber production? The usual thing has been simply to use these photogrammetry techniques for making a base map and cover-type map at low cost. This map greatly simplifies the job of estimating timber volume and acreage. Choate (*9*) and Sump (*44*) describe the procedure used in Forest Service Region 9. In the Pacific Northwest, stratified random sampling using delineated areas has been used to improve the accuracy of results. In the Central States hardwood region, the forest survey has used "triple sampling"—the sampling within a sample of delineated classes—with good results.

Recently an improved sampling design for the forest survey of the Northeast was developed and described by Bickford (*2*). This method omits the delineation of strata on the photographs and classifies photo plots on a 1-acre area surrounding the randomly selected plot centers or points on the photo print. A mathematical sampling design used by Neyman (*36*) for human populations has been adapted to sampling tree populations.

Shorn of statistical formulae the method, called "double sampling," depends on the classification of a sample of photo-plots into stand-size or density classes, which can be done quite cheaply. A sample of the photo-plots is then measured on the ground. The goal is an estimate of total volume, which is the product of area and average volume for a given stand-size or

Springs, Colo., September 1953.

that they must convert their stands ing to continuously improve pro-

density class within the forest. The correlation of ground-plot volume and photo-plot class is good enough to give a reliable volume estimate. The sampling error may be computed to measure the reliability of this volume estimate. This method has worked well in the Northeast, where strata are difficult to delineate, and in the forest survey where delineation of actual areas by strata is not required.

Bickford suggests the application of this design to the forest inventory of a large property, when a stand-class map is unnecessary, instead of conventional methods of timber-cruising or other aerial-photography methods that depend on delineation.

The problem of determining progressive stand changes in stocking due to natural mortality, cutting or commodity drain, and growth, has also occupied the attention of the modern statistician concerned with keeping state-wide forest-inventory figures up to date.

Osborne (*37*) describes a continuous-plot-inventory method, some of the features of which were tested during the forest survey on the Eastern Shore of Maryland by Bickford, Chapman, and Caporaso (*3*). This test proved that: (1) supplemental ground plots or strips for estimating drain are too expensive except as a last resort; (2) growth can best be determined from a sample of identified individual trees rather than by attempting to identify all trees on the plot individually; (3) the use of duplicate photo coverage of different dates is a promising method for estimating drain; and (4) the use of cubic-foot volume classes was superior to conventional stand-size classes for determining forest-area strata through photo-interpretation.

Osborne (*38*) further discusses the use of a continuous inventory of permanent plots as a means of estimating stand changes due to growth, mortality, and cutting. Various statistical methods of determining growth on remeasured individual trees or the entire stand on remeasured sample plots, are outlined.

He says, "Since this method is based on actual growth measurements its errors are confined to sampling errors and the statistical errors in regression equations."

The Method Proposed

The control method can be modified to provide for large-scale application by use of aerial photography and statistical sampling, for the purpose of timber-management planning.

Traditionally the *methode du controle* has been applied within the framework of the compartment with actual ground tallies based on caliper measurements of all trees above a certain size limit. The high cost of such intensive records has deterred the adoption of this method in most countries of the world.

The proposed procedure is to use the techniques of modern forest-survey design to: (1) get initial inventory data; (2) reinventory some of the initial ground plots with additional new samples each year, within areas that are to be harvested during the succeeding year; and (3) estimate changes in stocking due to growth, mortality, and cutting on some of the inventory plots after one cutting cycle.

Regulation of the cut will be based on the stand-structure methods previously discussed. Provision will be made for improving the stand structure and increasing the growing stock to obtain the maximum forest production.

A modified or inexpensive delineation of broad type or site classes of permanent nature and operable or inoperable timber classes is proposed as part of the management plan.

Initial Inventory Survey

Basic data to be obtained in the initial inventory survey will include: Numbers of trees and volume by major species or species groups and 2-inch diameter classes within each stratum delineated; area by these same delineated classes; and distribution of volume by tree-quality classes. Borings of sample trees on ground plots will be used to get preliminary data on diameter growth by species and tree size.

Aerial photography will be essential to this inventory and to later operations of the modified continuous-inventory system proposed. Sample photo-plots will be spotted on the prints for classification as outlined by Bickford (*2*). Ground-plot samples will be similarly selected and measured. The design formulae permit determination of the number of plots required to reach a given standard of accuracy required by the land manager.

For management-plan purposes, in locating various stands or stand conditions it will be necessary to delineate areas on the aerial photographic prints. The extent or degree to which delineation may or should be used is our next concern.

The Problem of Delineation

For the purposes of getting an inventory showing total volume, it has been shown that actual delineation of strata on aerial photographs is not necessary. There are many who feel that mapping or delineating detailed forest-cover types, stand size, and density classes is very essential to the forest manager. In some systems of inventory, delineation is the first step to obtaining volume estimates in that the sample plots are located within various mapped strata.

Admittedly the forest manager must have certain area statistics and be able to locate various stand classes on his property for efficient management. For the purpose of making practical management plans, R. R. Reynolds (*39*) of the Southern Forest Experiment Station warned against excessive classification of forest areas as follows:

"Foresters seem to have a universal failing. They have 'type-itus'. By this I mean they try their best to recognize as many forest types as possible in their mapping, cruising and management work. Not only that, but it seems that a type map is no good unless each type is broken down into about a dozen stand classes."

He suggests that the use of too

many classes will lead to frustation and that the boss will then throw the whole plan out the window as entirely impractical.

Methods of delineation, and field checking by ground plots, are outlined by Choate (*9*) and Sump (*44*) for the Region 9 system. Costs of preparing base maps from aerial photographs on which some 26 cover types, four stand-size classes, and three density classes are delineated averaged 5.5 cents per acre for 3½ million acres so far covered in the Lake States and Central States.

One of the difficulties in such a detailed job of area delineation is the fact that many of the classes shown are subject to fairly rapid change due to growth, stand succession, and cutting practices. This makes the base map out of date after a short period. With all due respect to the Region 9 system of map preparation, it seems obvious that a less detailed set-up is required to apply the method of control on an extensive sampling basis.

We propose that only broad type groups of a regional nature be recognized or delineated on aerial photographs for a given working circle.[2] Stand-size classes or density classes are ephemeral in terms of forest management. What we need to know is whether there is enough timber to support a thinning or harvest cutting, or, in other words, whether the given stands are operable or inoperable.

In terms of operability we would consider a stand operable if it contained trees of a size and species to be cut for pulpwood in a region where there is a market for such material. In this scheme the minimum size of area to be delineated on the photos would be at least 40 and possibly 100 acres.

Subdivision of Working Circle

The subdivision of a large working circle may be into major administrative divisions called *blocks*, usually based on topography. These in turn may be divided into smaller units called *compartments*. While the smallest unit, the compartment, serves a useful purpose in intensive forest regulation, it is likely to be a handicap instead of a help in the extensive sampling kind of continuous inventory described here. The following alternative scheme of subdivision of the working circle is proposed.

Divide the total area of operable stands within the working circle into as many subdivisions or blocks as there are years in the proposed cutting cycle. Where wide differences in the volume of growing stock are known to occur, this should be taken into account in the subdivision of area. The goal is an approximately equal cut each year rather than equal area operated.

Cutting Budget

The cutting budget designates the areas and order or time of cutting of the operable stands within various blocks. This will also guide the remeasurement of plots in reinventory surveys since this plan calls for such an inventory every year of the areas scheduled for cutting during the following year.

For example, with a 10-year cutting cycle the cutting budget would indicate which of the 10 subdivisions or blocks would be operated during each year of the cycle. The management plan can only be applied on the ground through an action program for logging, listing the areas and volumes to be removed annually. In this way a systematic coverage of the entire working circle is obtained.

Reinventory Technique

On areas budgeted for cutting, all sample plots of the original inventory that are still in existence and can be relocated would be remeasured during the year prior to logging. Approximately an equal number of new ground plots would be selected at random within the operable stands and measured at the same time to provide a better estimate of total volume for the entire block. The information from these annual reinventories will also provide an amended estimate of the allowable cut for each block about to be operated. The selection of the new plots would follow the same statistical design as that for an initial inventory as outlined by Bickford (*2*).

The ingrowth of small trees into the measurable size category, growth of residual trees in diameter volume, losses due to natural mortality, and drain from harvest cutting will be shown as a net change in the stands on remeasured initial inventory plots. Computations of volume on remeasured plots will be based on the same local-total-cubic-foot-volume tables previously used, to attain uniformity. These sample-plot remeasurements will provide the same kind of data on change as the 100-percent periodic inventories of the traditional *methode du controle*.

Some of you may still have lingering doubts as to the reliability of data from a few ground plots, even though they are supplemented by a larger sample of photo-plots. Do these random samples really represent the stand conditions of the larger universe or working circle?

The computation of sampling error provides assurance that the estimated volume is reliable within a certain percentage, plus or minus, of the true value. We accept the results of sampling timber stands by means of 5- or 10-percent strip or line-plot cruises. Much greater accuracy—at less cost—can be attained by using fewer plots when they are supplemented by use of aerial photography and the modern statistical designs for collecting samples.

Allowable Cut

The method of estimating the allowable volume of cut during a given cutting cycle within a working circle or block containing operable timber is as follows:

1. From the initial inventory ground-plot samples, compute the average diameter distribution (number of trees per acre) by 2-inch diameter classes. Plot these values on semilogarithmic cross-section paper. The usual result is a graph similar to that shown in

[2] Gross (*16*) defines a working circle as "a forest area from which a sustained yield of forest products is planned."

outlined.

sample trees on ground plots will

He suggests that the use of too

Figure 1. This represents the original growing stock available.

2. From growth by d.b.h. classes (determined from sample-tree increment cores on the ground plots or from measured trees if at the end of the first cutting cycle), plot the expected diameter distribution 10 years later. Mortality may be neglected in partially cut stands for purposes of this initial estimate of growth.

3. Decide on the maximum size of tree to be grown. In the example (Fig. 1) this was set arbitrarily at 24 inches, but it could be at any other size. The marker could be instructed to raise this limit in the case of individual trees if desired.

4. Compute the q (de Liocourt's quotient) of the expected stand at the end of the first cutting cycle or 10 years later. This is likely to be too high for optimum yield in most unmanaged stands, Meyer (*30*). In the example (Fig. 1) $q = 1.85$.

5. Set as the goal for the end of the first cutting cycle a q somewhat smaller than that computed above, thus permitting an average stand of a little more volume per average acre. In one decade a reasonable figure would be a change from $q = 1.85$ to $q = 1.75$. The long-term goal might well be a q of 1.6 or 1.5, approaching all-aged managed Swiss forests.) The line for a q of 1.75 is shown in Figure 1 from 6 inches to 24 inches d.b.h.

6. The material that may be cut is represented by numbers of trees between the $q = 1.75$ line and the plotted values for the stand expected at the end of the first cutting cycle. This allowable cut also includes all trees presently above the 24-inch d.b.h. which is set arbitrarily as the maximum size of timber desired.

As shown in Figure 1, the cut will consist largely of trees 12 to 16 inches d.b.h., thus reducing the excess numbers and volume in this part of the stand graph. Ample numbers of trees to grow into the 18- to 24-inch classes during the next cutting cycle would be left. At the time of next remeasurement of sample plots, the new goal of an adjusted q will again guide the cutting toward a balanced stand structure best fitted to produce the maximum of timber possible for the site and climate.

The Method in Operation

This method obviates the need for a large job of inventory survey at a given period following the initial inventory. This work of reinventory is done annually, on a block or other subdivision of the working circle, during the field season preceding logging.

The demands of the method are relatively light. For example, the initial inventory of a 700,000-acre forest, of which 200,000 acres was in operable stands within the working circle, could be accomplished with about 3,000 photo plots and 300 ground plots at a cost of 1.6 cents per acre for the gross area, or 5.7 cents per acre for the operable area. This includes cost of flying and photo prints as well as photo-interpretation, delineation, and ground-plot establishment.

Once the method is in operation, the annual reinventory of each of ten 20,000-acre blocks would require the remeasurement of about

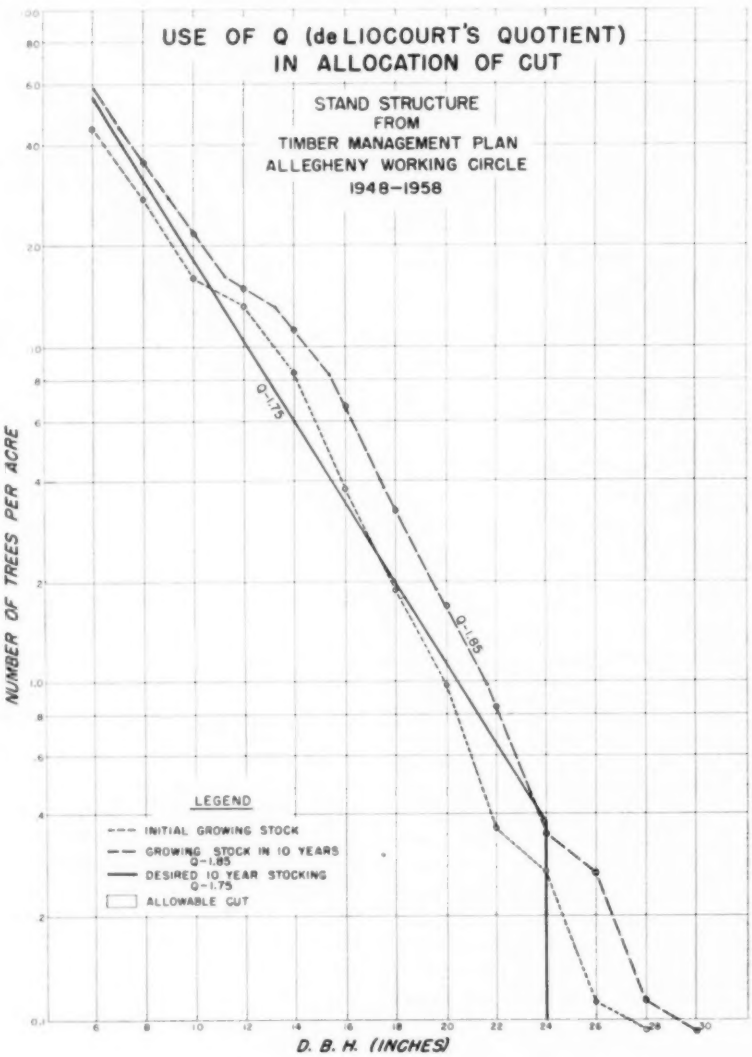

FIG. 1.—How de Liocourt's quotient is used to determine the allowable cut.

planned."

provide an amended estimate of the

a graph similar to that shown in

10 original ground plots and 40 or 50 new ground plots. Using local experienced foresters as party leaders and skilled labor as helpers, this job could be done in about 3 weeks time in moderately rugged topography. Where "Nature is on edge" a longer time would be needed.

The reinventory costs per year —including photography, ground plots, photo-interpretation plots, and any delineations and computations needed—should not exceed $1,700 for the 20,000-acre block. This amounts to about .085 cents per acre—a low price for a workable management plan.

After 15 or 20 years new aerial photography should be obtained. This will enable the forest manager to check on stands that have grown into the operable class in the interval. These should be delineated. Stands lost from the operable class should be removed from consideration at this time. New area statistics will result, as will improved accuracy in the photo-interpretations of sample plots. All newly operable areas within a given block will be sampled by methods used in the initial inventory.

The beauty of this whole scheme is that, once put into effect, the plan does not become obsolete with stand changes but records the effects of all operations faithfully and at minimum cost and will continue to guide the forest manager toward optimum production of forest products.

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FIG. 1.—How de Liocourt's quotient is used to determine the allowable cut.

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Ernest E. Hubert (1887-1954)

Dr. Ernest E. Hubert of Moscow, Idaho, died June 2 of a heart attack. A distinguished forest pathologist he was widely recognized for his many scientific contributions to American forestry.

Born in Philipsburg, Mont. September 17, 1887, his forestry education was obtained at the Montana State University where he received the B.S. degree in 1912 and the M.S. degree in 1918. His Ph.D. degree was granted by the University of Wisconsin in 1923.

Beginning in 1920 he served five years on the research staff of the Forest Products Laboratory, then taught and conducted research in forest pathology at the University of Idaho during the period 1925-1935. In the latter year he undertook a program of research for the Western Pine Association, remaining until 1942 when he went with Monsanto Chemical Company for seven years, and returned to the University of Idaho School of Forestry until his retirement in 1953.

In addition to his career-long membership in the Society of American Foresters, Dr. Hubert was a member of numerous scientific and technical organizations including the American Association for the Advancement of Science, American Wood Preservers Association, Forest Products Research Society, and several scientific fraternities.

His publications total 93, including a textbook on forest pathology published in 1931, and used throughout the English-speaking world. Long a leading authority on wood decay, he pioneered the use of pentachlorophenol preservatives.

Multiple Land Use: Timber, Cattle, and Bobwhite Quail[1]

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THE PRE-EMINENCE OF bobwhite quail (*Colinus virginianus*) as a game bird in the South has long been recognized. Bobwhite is a true product of the land—a natural resource of unquestioned value; a human need of high esteem.

Four years ago Goodrum (*4*) addressed this Conference and told of declining quail populations in 25 of 39 sampled states. The principal quail states of the South were among those reporting decreased numbers of quail. The decline was attributed chiefly to current land use practices, such as clean farming, livestock raising, and dairying which resulted in a loss or deterioration of quail habitat.

Bobwhite is usually thought of as farm game. Current quail habitat improvement work is aimed largely at agricultural lands. However, fair to good quail populations can be found remote from cultivation on unmanaged southern forests (*5, 8, 9*). The longleaf pine (*Pinus palustris*) forest belt which extends from Virginia around the Atlantic and Gulf Coastal Plain to east Texas, harbors quail. These wild lands furnish sport for a large number of quail hunters, for there is no problem in securing hunting privileges. The longleaf pine lands, an area according to Wahlenberg (*10*) of 15 to 20 million acres, are managed nonintensively, generally, and intensively, locally, for the production of timber and cattle. In west-central Louisiana, landowners are finding it economically expedient to coordinate timber and cattle production on longleaf pine land (*1, 3, 7*). The same trend is apparent in other parts of the longleaf pine range.

Fire

Longleaf pine forest land has been subjected to repeated burning over the last three centuries. It is common knowledge that the free range cattleman of the South burned the woods to rid the ground of dead mantle and thus bring about new and succulent forage for grazing purposes. The grazing study of pine forest ranges in Louisiana by Campbell and Cassady (*2*) reports that the chief result of burning is the removal of old dead grass so that cattle can graze solely on new green grass of high nutritive value. Wahlenberg et al. (*11*) showed that range burned each winter was better in quality and produced greater cattle weight gains than similar unburned range. Campbell and Cassady (*2*) suggest the feasibility of obtaining better distribution of cattle on the range by prescribed burning ungrazed or lightly grazed areas each three to five years. Wild and prescribed fire for forage production is still prevalent in southern forests.

The forester also uses fire in managing longleaf pinelands. He prescribes burning for various reasons: to reduce fire hazard, to control brown spot needle disease (*Scirrhia acicola*), to ready the ground for planting or for seed fall in good mast years, and to control brush and scrub oak growth (*6*). These types of burning, both promiscuous and prescribed, of longleaf pine ranges influence quail and quail food plants. Stoddard (*9*) has pointed out that the indiscriminate use of fire can work to the disadvantage of quail. How-

TABLE 1.—AVERAGE NUMBER OF QUAIL FOOD PLANT STEMS PER 100 SQUARE METER PLOTS IN VARIOUS AGE BURNS ON LONGLEAF PINE LAND IN WEST-CENTRAL LOUISIANA, 1948-52

Plants	Average number of stems per 100 square meter plots			
	1-year burn	2-year burn	3-year burn	4-year burn
Pea family				
Butterfly pea (*Centrosema* spp.)	8.52	17.57	5.48	6.96
Partridge pea (*Chamaecrista* spp.)	42.38	13.68	6.67	6.86
Rattlebox (*Crotolari* spp.)	1.00	2.00	0.70	2.30
Tickelover (*Desmodium* spp.)	110.95	61.43	22.84	31.44
Clusterpea (*Dioclea multiflora*)	0.30	0	0	0
Milkpea (*Galactia* spp.)	24.73	15.08	19.88	15.02
Common lespedeza (*Lespedeza striata*)	131.35	1.08	0.14	8.95
Bush clover (*Lespedeza* spp.)	9.43	8.86	3.70	5.77
Rhynchosia (*Rhynchosia* spp.)	5.63	5.28	6.82	2.58
Wildbean (*Strophostyles* spp.)	3.80	2.50	2.70	8.30
Pencil flower (*Stylosanthus biflora*)	131.65	49.45	47.92	38.40
Tephrosia (*Tephrosia* spp.)	195.12	195.48	133.23	197.71
Average for legumes	662.17	370.76	248.81	320.09
Spurge family				
Goatweed (*Croton* spp.)	9.13	1.24	0	0
Flowering spurge (*Euphorbia corollata*)	24.88	12.75	11.57	5.07
Treadsoftly (*Jatropha stimulosa*)	.60	1.24	.29	.29
Queen's delight (*Stillingia sylvatica*)	5.93	9.17	5.34	4.47
Noseburn (*Tragia* spp.)	47.56	46.18	22.25	30.24
Average for spurges	88.12	70.60	39.46	40.09
Sedge family				
Beakrush (*Rhynchospora* spp.)	18.72	98.60	39.76	33.03
Nutrush (*Scleria* spp.)	34.99	29.23	12.75	11.84
Average for sedges	54.72	127.83	52.52	44.87
Sumac family				
Poison oak (*Toxicodendron quercifolium*)	31.50	21.30	19.58	23.08
Average for all plants	836.52	590.51	360.38	428.15
Percentage comparison	100	70.5	43.0	51.1

[1]Presented at the North American Wildlife Conference, Washington, D. C., March 9-11, 1953.

[2]I wish to express my appreciation and thanks to Phil Goodrum, regional biologist, U. S. Fish and Wildlife Service, for his guidance and assistance in the field studies; to C. J. Perkins, C. E. Harrison, and H. C. Beasley, Federal Aid Project 23 D, Louisiana Department of Wildlife and Fisheries, for ploughing the firelanes, supplying the fertilizer, and assisting with fertilizer application on the experimental plots; and to Guy Cox, forest ranger, U. S. Forest Service, for accomplishing the burning of the experimental plots.

ever, judicious burning in winter can be used to improve quail habitat.

Fire and Herbaceous Quail Foods

Stoddard's (*9*) work in the east Gulf Coastal Plain, where wiregrasses (*Aristida* spp.) and broomsedge (*Andropogon virginicus*) constitute the main forage and ground cover, showed that desirable quail food legumes came in abundantly following winter burning. Similarly Wahlenberg et al (*11*) in their study of fire and cattle on longleaf pine lands at McNeil, Mississippi found that legumes were more abundant on annually burned pastures than they were on fire-free areas.

The influence of fire on herbaceous quail foods has been studied over a five-year period in the west Gulf Coastal Plain area where bluestem (*Andropogon* spp.) grasses replace the wiregrasses of the east Gulf Coastal Plain pine lands. From the examination of the food contents of 3,053 quail craws taken from the wild longleaf pine lands of west-central Louisiana, a list of salient forb food plants was prepared. On the Kisatchie Division of the Kisatchie National Forest, Louisiana, where records of prescribed winter burns were available, field checks were made for the relative abundance of these quail foods, in one- two- three- and four-year or older burns. The number of stems of eleven genera of legumes, five genera of spurges, two genera of sedges, and the poison oak plant were tallied in square meter plots on transects across these various age grass roughs or burns. The plots were checked at the end of each growing season. In the five-year period, 3,636 plots were examined.

Table 1 summarizes the material. For the legumes and spurges, one- and two-year old roughs contained the greatest number of stems. Burns three and four years old contained roughly only half the number of stems found in one-year old burns. The sedges had the greatest number of stems on the two-year old burns, and the fewest stems in the four-year old burns. Poison oak was most abundant on one-year old burns. It was slightly less abundant, but uniformly so, in the older roughs. Of all the plants checked, poison oak and tephrosia seemed to be influenced least by the accumulation of heavy grass mantle. Their abundance was more or less uniform in the four categories of rough. Considering all quail food plant stems for the various age roughs, the percentages for the one- two- three- and four-year old burns were respectively 100, 70, 43, and 51. Collectively, there were more herbaceous quail food plant stems in one-and two-year old grass roughs, than there were in three- and four-year old roughs.

Also, it was noted that these plants were more robust and thrifty in the lighter grass stands. In the older burns they were suppressed and dwarfed; their seed production was not as good as on the plants in the lighter roughs.

To determine more definitely the influence of fire on grass stands and herbaceous quail foods, six treatments were applied to a six-acre experimental block on the Kisatchie National Forest. The treatments for the one-acre plots were as follows: (1) control; (2) ploughing; (3) annual burning; (4) annual burning and fertilizing with 200 pounds of 4-12-4; (5) annual fertilizing with 200 pounds of 4-12-4; (6) annual fertilizing with 200 pounds of superphosphate. At the beginning of the investigation the entire area had a heavy eight-year broomsedge rough. From sample plots, the ground cover was estimated at 98 percent grass. Although present on the area at one time, legumes occupied only trace proportions in the ground cover.

Table 2 summarizes the data of this burning study. After treatment for three years, grass ground cover remained heavy on all but the burned plots. It was reduced to 45 percent on the annually burned plot and 41 percent on the annually burned and fertilized plot. Common lespedeza, partridge pea, and tickclover came in abundantly on these plots. They composed 33 percent of the ground cover on the burned plot and 20 percent on the burned and fertilized plot. These legumes were found in only trace or small proportions in the other treatments. The use of fire on these experimental plots increased the abundance of desirable legumes from trace proportions to substantial numbers.

Grazing Complements Fire

Grazing on the open range longleaf pine belt tends to complement fire in controlling heavy grass roughs. Open range grazing has a tendency to be spotty; grazed areas are found intermingled with heavy roughs. Some of the herbaceous quail food plants, such as goatweed, partridge pea, tickclover, common lespedeza, rhynchosia, pencil flower, and noseburn seemed to benefit from moderate grazing for it kept down the heavy grass foliage which would ordinarily smother out these plants.

According to Campbell and Cassady (*2*) grasses and grass-like plants make up about 95 percent of the average year-long diet of

TABLE 2.—PROPORTIONS OF GRASSES AND LEGUMES ON PLOTS, BY TREATMENTS. RED DIRT GAME REFUGE, KISATCHIE NATIONAL FOREST, LOUISIANA, 1949-1952

Treatments	Ground cover							
	Common grasses[1]		Common lespedeza		Partridge pea		Tick-clover	
	1949	1952	1952	1952	1949	1952	1949	1952
	Percent							
Control	98	90	T[2]	T	T	T	T	T
Ploughed	98	75	T	0.1	T	T	T	T
Annually burned	98	45	T	19.	T	10	T	4.
Annually burned and fertilized, 4-12-4	98	41	T	14.	T	3.	T	3.
Fertilized, 4-12-4	98	92	T	0.25	T	T	T	T
Fertilized, superphosphate	98	85	T	3.25	T	T	T	0.25

[1]Chiefly broomsedge (*Andropogon virginicus*).
[2]Trace.

cattle on the open range, and herbs constitute only four percent of the diet. In addition to tallying the number of quail food plant stems in the various age burns, a record was kept of the number of stems grazed by livestock on the open range and by deer on a cattle-free area in the Red Dirt Game Refuge, Kisatchie National Forest. Table 3 summarizes the data. Cattle stocking was light, about one head per 60 acres, on the areas checked. Partridge pea, tickelover, milkpea, bush clover, tephrosia, goatweed, flowering spurge, and noseburn showed some utilization by cattle. Common lespedeza, a forage plant of recognized value in the South, occurred on some of the plots, but it escaped use. Even under grazed conditions, however, this plant is capable of seed production; it is a valuable piney woods quail food. Although the percentage of grazed stems varied with each species of plant checked, the overall percentage of stems grazed was less than three percent. With the exception of partridge pea and milkpea which were not consumed, deer utilized the same plants as the livestock on the open range. Here again the utilization was less than three percent. Under the existing open range stocking rates, livestock did not seriously damage natural occurring quail foods by grazing. Further, the grazing activity kept down heavy grass foliage and thereby complemented the use of fire in maintaining a good ground cover density for quail food plants and for free movement of quail on the ground.

TABLE 3.—QUAIL FOOD SPECIES BROWSED BY CATTLE AND DEER ON 1,514 ONE METER SQUARE PLOTS, ON A LONGLEAF PINE FOREST RANGE IN WEST-CENTRAL LOUISIANA, 1948-49

Plants	Open range[1] Total stems	Open range[1] Percent browsed	Cattle-free area[2] Total stems	Cattle-free area[2] Percent browsed
Pea family				
Butterfly pea (*Centrosema* spp.)	87	0	171	.6
Partridge pea (*Chamaecrista* spp.)	474	1.0	130	0
Rattlebox (*Crotolaria* spp.)	0	0	0	0
Tickelover (*Desmodium* spp.)	1,162	5.3	430	17.4
Clusterpea (*Dioclea multiflora*)	0	0	0	0
Milkpea (*Galactia* spp.)	222	1.3	235	0
Common lespedeza (*Lespedeza striata*)	1,568	0	1,141	0
Bush clover (*Lespedeza* spp.)	93	3.2	32	0
Rhynchosia (*Rhynchosia* spp.)	48	0	58	0
Wildbean (*Strophostyles* spp.)	0	0	0	0
Pencil Flower (*Stylsanthus biflora*)	1,548	0	405	0
Tephrosia (*Tephrosia* spp.)	1,276	4.6	1,632	2.5
Total and percent for legumes	6,478	2.1	4,234	2.7
Spurge family				
Goatweed (*Croton* spp.)	120	1.6	23	0
Flowering spurge (*Euphorbia corollata*)	197	10.1	146	3.4
Treadsoftly (*Jatropha stimulosa*)	1	0	11	0
Queen's delight (*Stillingia sylvatica*)	70	0	65	0
Noseburn (*Tragia* spp.)	439	5.6	463	.1
Total and percent for spurges	827	5.6	708	.8
Sumac family				
Poison oak (*Toxicodendron quercifolium*)	235	0	203	0
Grand total and percent	7,962	2.3	5,615	2.2

[1]The open range was grazed by cattle, sheep, and goats in moderate numbers.
[2]The cattle-free area was on the Red Dirt Game Refuge, Kisatchie National Forest, La. Although the area was cattle-free, it harbored a rapidly growing deer herd; plant utilization on the area was that of deer.

Other Uses of Fire in Quail Management

The careful use of fire is a helpful tool in other phases of woods management of quail. Stoddard (*9*) found fire useful in controlling noxious rodents that inhabit heavy grass roughs, in retarding and knocking back deciduous jungle undergrowths, in serving as an apparent sterilizing agent, and in maintaining the proper ground cover density for free movement of quail on the ground. His study indicated that quail were reluctant to use areas of heavy grass roughs, and quail populations in such areas were usually low. He pointed out that, even if seeds were abundantly present in such areas, quail would not be able to utilize them because of the heavy ground mantle.

From the hunters' standpoint, fire and grazing facilitate good dog work. Heavy grass roughs cut down on the efficiency of the dogs and rapidly tire both dogs and hunters. Light grass roughs make piney woods hunting more enjoyable to dog and man.

Summary and Conclusions

With proper coordination, timber and cattle can be grown together on longleaf pine land in the South without serious conflict; landowners are finding it economically expedient to integrate production of timber and cattle. Quail are a product of this type land. In handling the land for timber and forage production, fire is employed. Fire, judiciously used, can be beneficial in many ways in managing longleaf pine woods for quail. Investigations of the bluestem longleaf pine range of west-central Louisiana indicate that controlled winter burning every three or four years in alternating or overlapping blocks will help keep naturally occurring herbaceous quail foods abundant. Annual winter burning of vegetation on small plots where quail food plants are established will help keep them abundant and their seeds readily available for feeding quail. Herbaceous quail food plants in this area are not grazed heavily when ranges are lightly stocked; hence, light to moderate grazing complements fire by keeping down heavy grass foliage that would ordinarily hinder the growth and seed production of these plants. Fire and grazing are useful in maintaining ground cover density in piney woods that allows freedom of movement and easy feeding conditions for quail. The task of coordinating wildlife production with multiple-use management of wild forest lands mentioned by L. F. Watts, former chief of the U. S. Forest Service, in his address to this Conference in 1946, still remains. The dovetailing of prescribed burning for the benefit of quail into the fire program of

timber and forage production on multiple-use longleaf pine forest land of the South is a worthy challenge to sportsmen, to sporting goods entrepreneurs, to land owners both public and private, and to others interested in the production and management of bobwhite quail.

With the stress on clean farming in modern day agriculture, which leaves little room for bobwhite on the farm, it behooves those concerned to find a better place for bobwhite on the multiple-use forest lands, for it is to these lands that the sportsmen will be looking for quail hunting in the future. The forest lands offer an opportunity for bobwhite management with little conflict to timber and cattle production; the hunter has easy access to hunting privileges on such land. To what other upland game bird can the one-gallus hunter turn that will reward him for keeping a bird dog in the backyard the year around with the opportunity of hanging his hunting coat near the back door for 2½ months of excellent shooting each year?

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Forest Fires Fewer in 1953

Last year shows an 18 percent decrease from 1952 in the number of forest fires, the Department of Agriculture reports. This record is outstanding, according to the Forest Service, in view of the extreme drought in many forest areas last year.

Forest Service field offices, state foresters, the Soil Conservation Service, the Department of the Interior and the Tennessee Valley Authority reported a total of 154,160 forest fires during 1953—the lowest number since 1946 when there were wartime restrictions on travel. This is much lower than the 210,000 average for the five years before the present state and federal cooperative forest fire prevention campaign began under the sponsorship of The Advertising Council in 1942; a program whose trademark is Smokey the Bear. This advertising campaign was valued at $7,000,000 in 1953. A new addition last year was the promotion under special licenses by manufacturers and retail stores of Smokey Bear educational toys, clothing, and other merchandise stressing forest fire prevention.

This campaign and the Keep Green Programs, which are sponsored by the states in cooperation with the timber industries, have made people increasingly aware of the need for forest fire prevention. Through public cooperation, man-caused fires have decreased —145,632 in 1953 as compared to 180,265 in 1952.

In spite of last year's record, Forest Service Chief McArdle points out, still too many fires are man-caused. Of the fires on lands which are under the organized protection of private companies or state or federal agencies, investigation showed 30,186 were deliberately set; 22,537 brush and rubbish fires got out of hand; smokers caused 20,696; campfires started 5,140; railroads were responsible for 2,619, and lumbering operations, for 2,309.

The Dexter Case

S. L. Frost[1]
Falls Church, Virginia.

The lines were clearly drawn in this famous Washington state case. The issue was the rights of private property vs the police power of the state and it clearly established that the courts of the land have now become a potent force in forestry.

WHEN AVERY DEXTER, a State of Washington timber owner and operator, was stopped from further timber-cutting operations on his land for failing to comply with the state forest practice act, his ensuing law suit wrote one of the most significant chapters of forest policy in the history of the United States. The case went all the way to the U. S. Supreme Court and was the first time forest regulation of cutting on private lands was tested by the highest court of the land. Thus it clearly established one thing: that the courts have become a powerful influence now in the development of conservation—a movement which is embracing an ever-widening circle of society.

While the Dexter case was a test of the application of technical forestry on the ground, it was not in the true sense a test of the scientific feasibility of technical rules. It was more basic than that. It was a fight in its final analysis, to determine the limits of the rights of private property owners to do as they please with their land, as against the police power of the state in regulating those uses for the public good. The case came before three courts and its echoes were not stilled until as Case No. 344 on November 7, 1949 in the impressive halls of the United States Supreme Court, the judges, in a decision by the whole court ruled, "The judgment is affirmed."

It may be that historians may show some day that the initial test of private forestry regulation came, not with enactment of state laws towards this end, but with the Dexter case, which upheld and established the constitutionality of one of these laws. As such, the case is also significant as a stalwart bulwark of reference for future as well as present regulatory laws, because according to procedures and precedent of law, rulings of one court set an indelible record for general acceptance by other courts at other dates.

The dramatic and convincing arguments by justices of both sides of the case, enriched by the opinions of earlier courts, are a revealing insight of the fine line which separates free enterprise from public welfare. The records of the Washington state supreme court contain the full story. To appreciate the impact of the case some of the background should be known.

The Forest Practice Act, passed by the state of Washington in 1945, is designed to keep the private forest lands of the state productive. The act provides that an owner or operator must obtain a logging permit from the state prior to any cutting and agree to abide by its rules. Certain numbers and kinds of trees are to be left standing, depending on the forest type and size of timber, or the owner may substitute other acceptable methods. For failing to comply with any of the provisions, the state may close the logging operations. The owner or operator must then provide a cash deposit, not exceeding $8 an acre, for the area mismanaged, where sufficient seed trees are not available. If at the end of five years the owner has not satisfactorily reforested the area, or it has not reseeded, he forfeits the fee and the state does the replanting. Provisions of the act release an owner from cutting rules where he desires to turn the property to other use.

The test of the legality of this act was the case of Avery Dexter whose timber-cutting operations on his 320-acre tract of second-growth timber which he held in fee in Pend Oreille County, Wash., were shut down by the state forester in 1947 for failing to obtain a permit, as directed under the law.

The record indicates that "Dexter refused to apply for a permit and proceedings were instituted by the state enjoining further timber cutting operations until such time as he should apply for and receive a permit from the state forester, which permit he could not obtain without giving satisfactory assurance that he would comply" with the forestry act. The case was brought to the superior court in Pend Oreille County.

Dexter maintained that the act permitted what was the same as taking private property without compensation; established unreasonable exercise of police power; destroyed private property rights and impaired obligation of contracts as guaranteed by the Constitution; granted special privileges to certain owners; and that it was "unreasonable, unnecessary, arbitrary and not required for the general welfare."

The state on the other hand contended that the act was equally applicable to all land owners and that all Avery Dexter had to do was to agree to leave uncut all ponderosa pine 16 inches and under in diameter. "He does not have to agree to keep the land; he does not have to agree to grow timber; he does not have to guarantee reseeding. He just has to leave sufficient trees for that purpose," the state said.

In his Memorandum of Opinion, trial court Judge W. Lon Johnson endorsed the rights of private property and of free enterprise as contrasted to the "effect of bureaucratic controls and being convinced that the statutes under which the state forester had brought action were unconstitu-

[1]The author is indebted to E. J. Jacobson, legislative assistant for Senator Price Daniel, who checked the manuscript and offered helpful suggestions during its preparation; and also to the Division of Forestry, Department of Conservation and Development, State of Washington for materials on the case which it furnished.

tional, dismissed the case." Judge Johnson wrote:

"The invasion of the respective states, as well as the federal government, in the right of every individual to conduct his business in compliance with the law has gone far beyond our conception of a few years ago of what could possibly happen.

"It should not be permitted to go further irrespective of the extent that a legislative body may believe it should go, voluntarily or under undue pressure. It is apparent that if the constitutionality of the law is upheld, that it is only one step further to the control, domination, and in fact, operation of the farms and other lawful business of the state, directed by bureaus, agencies and incompetents . . . regardless of the wishes and experiences and judgment of the landowner of the land.

"This should never be permitted, but if there is a continuation of the policy as indicated in the present law, there can be no end to final and complete control and domination of the forests and farms of every type, as well as other business activities of the people of the state under guise of the police power."

After failure in the lower court, the state then appealed to the state supreme court which on February 18, 1949 delivered its opinion, and reversed the opinion in favor of the state saying that the trial court erred in dismissing action.

The summary arguments of Associate Justices Matthew W. Hill, who delivered the opinion of the court, and George Simpson who dissented, are exceptional treatises. They sharply define the problems of public regulatory conservation programs in the field of private enterprise, where the acts are restrictive. Judge Hill said: "We are in accord with much that has been said but it must be realized that private enterprise must utilize its private property in ways that are not inconsistent with the public welfare.

"The Supreme Court of the United States, speaking through its then chief justice, Charles Evans Hughes, once said in a ruling (Home Bldg. & Loan Assoc. *vs.* Blaisdell 290 US 398) 'It is manifest that there has been a growing appreciation of public needs and of the necessity of finding ground for a rational compromise between individual rights and public welfare. The settlement and consequent contraction of the public domain, the pressure of a constantly increasing density of population, the interrelation of the activities of our people and the complexity of our economic interests, have inevitably led to an increased use of the organization of society in order to protect the very bases of individual opportunity. Where, in earlier days, it was thought that only the concerns of individuals or of classes were involved, and that those of the state itself were touched only remotely, it has later been found that the fundamental interests of the state are directly affected, and that the question is no longer merely that of one party to a contract as against another, but of the use of reasonable means to safeguard the economic structure upon which the good of all depends.' "

Justice Hill then pointed out that "unfortunately Dexter's plea for the unrestricted right of the owner of timberland to do as he pleases with his own, the record of such unrestricted use has been one of 'cut out and get out' . . . While personally disclaiming any wasteful practices, the respondent says in effect that individuals must be left free to continue such practices because they have a vested right so to do.

" 'We do not think that the state is required by the constitution of the United States to stand idly by while its natural resources are depleted.' " it was once pointed out by Associate Justice Joseph McKenna of the Supreme Court, (Walls *vs* Midland Carbon Co. 254 US 300).

Justice Hill concluded: "The issue then is, can the state compel participation in a reforestation program on land for which no other beneficial use is contemplated?

"Edmund Burke once said that a great unwritten compact exists between the dead, the living and the unborn. We leave to the unborn a colossal financial debt, perhaps inescapable, but incurred nonetheless, in our time and for our immediate benefit. Such an unwritten compact requires that we leave to the unborn something more than debts and depleted natural resources. Surely where natural resources can be utilized and at the same time perpetuated for future generations, what has been called 'constitutional morality' requires that we do so.

"There is just one question before us," said the judge, "that is, is the statute constitutional? or stated more specifically, does the state have the right under its police power to require those who engage in commercial logging operations to make provisions for reforesting the area logged by leaving a certain number of trees for reseeding purposes or by restocking?"

Judge Hill then cited cases to develop the meaning of police power. He quoted from a previous opinion by Judge William J. Steinert of the Washington supreme court, (53 P 2nd 619): "However difficult it may be to give a precise satisfactory definition of 'police power', there is no doubt that the state in the exercise of such power, may prescribe laws tending to promote the health, peace, morals, education, good order, and welfare of the people. Police power is an attribute of sovereignty, an essential element of the power to govern, and a function that cannot be surrendered. It exists without express declaration, and the only limitation upon it is that it must reasonably tend to correct some evil or promote some interest of the state, and not violate any direct or positive mandate of the constitution."

In dissenting, Justice Simpson of the Washington Supreme Court said: "Because the majority opinion approves a law which takes from the people of this state another of their constitutional rights, I dissent.

"The development of the doctrine of the police power," Justice

Simpson pointed out, "has passed all the constitutional barriers, so that now all that is necessary to introduce and enforce any repressive measure, is to use a high-sounding, plausible preamble, and the courts will then approve, regardless of the fact that personal liberties are taken from the individual."

He also quoted from Justice George Sutherland of the Supreme Court: "Let us not forget that . . . the Constitution itself is in every real sense a law . . . the law makers being the people themselves, in whom under our system all political power and sovereignty primarily resides, and through whom such power and sovereignty primarily speaks. It is by the law, and not otherwise, that the legislative, executive and judicial agencies which it created exercise such political authority as they have been permitted to possess. The constitution speaks for itself in terms so plain that to misunderstand their import is not rationally possible.

"'We the People of the United States,' it says, 'do ordain and establish the Constitution.'

"Ordain and establish! These are definite words of enactment, and without more would stamp what follows with the dignity and character of law. The framers of the Constitution, however, were not content to let the matter rest here, but provided explicitly—'This Constitution and the Laws of the United States which shall be made in pursuance thereof . . . shall be the supreme Law of the Land.'

"The supremacy of the Constitution as Law is thus declared without qualification. That supremacy is absolute; the supremacy of a statute enacted by Congress is not absolute but conditioned upon its being made in pursuance of the Constitution. And a judicial tribunal, clothed by that instrument with complete judicial power, and, therefore, by the very nature of the power, required to ascertain and apply the law to the facts in every case or proceeding properly brought for adjudication, must apply to supreme law and reject the inferior statute whenever the two conflict." (Carter *vs* Carter Coal Co. 298 US 238).

Justice Simpson said: "As stated in the above case, 'Every-journey to a forbidden end begins with the first step.'

"That danger is apparent in the statute before us. The only difficulty with us is that we have too many times taken the first step.

"It is not too late to reform.

"True, it is of importance that we preserve our natural resources, but they should not be preserved at the expense of the liberties of the people of this state and Nation."

In analyzing the various sections of the Washington forest practices act, Justice Simpson stated that in his opinion; "The management and control of property owned by an individual is transferred to the forester. The American citizen who owns land upon which there are any trees has no longer any right to do other than obey the dictates of the state forester.

"Appellant says in its brief, 'It will not do to say that only land owner is concerned with whether timber growth is permitted on his land. That is the concern of the man who must in the future buy timber, of the laborer who hopes to make living from the lumber industry, or the merchant, or the banker, and the manufacturer, who depend upon a stable economy in our state. In short, it is the concern of everyone.'"

Justice Simpson continued: "In other words, it is the right of the state and not that of the citizen which counts. If this be so, why limit ourselves to timber? Why not include our fields, our grains, our livestock, our soil, our places of private enterprise, the rearing of our children, the ordering of our daily lives? For, are not these things too, the concern of everyone?

"What is more important than raising of families? If the argument of the state is sound, why not have marriage bureaus with a director at the head so every couple who desires to marry would be compelled to apply to the director for a permit, whereupon he would conduct an investigation to determine whether or not they were properly mated before approving their application?

"Why not, also, if the state is to be the predominant factor, compel people who wish to have children to first get a permit from the director of the bureau?

"In short, if we follow the argument to which I have just referred," the justice said, "and the holdings of this court in the present and some other cases, then we should have bureaus to see to it that we have government of men and not of laws—in other words, a police state."

On the other hand, Justice Hill, expressed his opinion: "There is ample and sound authority to sustain our conclusion that the challenged legislation is for the general or public welfare and is a proper exercise of the police power."

Quoting from *American Jurisprudence* (11,1034), "The state in exercise of its power to enact laws for the general welfare of its people, may enact laws designed to increase the industries of the state, to develop its resources, and to add to its wealth. The majority of the authorities, moreover, support the rule that not only adjoining landowners, but the public at large, have an interest in the preservation of the natural resources of the country sufficient to justify appropriate legislation to prevent exploitation or waste of such resources by the owners of the land on which they are found. This rule finds specific expression in laws forbidding any waste of natural gas, oil, or mineral waters and subterranean flows and in laws forbidding the cutting of standing trees."

Chief Justice Shaw of the supreme judicial court of Massachusetts (in State *vs* Van Vlack in 1851, 61 Mass 53) once argued: "We think it is a settled principle, growing out of the nature of well ordered civil society, that every holder of property, however absolute and unqualified may be his title, holds it under the implied liability that his use of it may be

so regulated, that it shall not be injurious to the equal enjoyment of others having an equal right to the enjoyment of their property, nor injurious to the rights of the community. All property in this commonwealth, as well *as* that in the interior as that bordering on tidewaters, is derived directly or indirectly from the government, and held subject to those general regulations, which are necessary to the common good and general welfare. Rights of property, like all other social and conventional rights, are subject to such reasonable limitations in their enjoyments as shall prevent them from being injurious, and to such reasonable restraints and regulations established by law, as the legislature, under the governing and controlling power vested in them by the constitution, may think necessary and expedient.

"This is very different from the right of eminent domain, the right of a government to take and appropriate private property to public use, whenever public exigency requires it; which can be done only on condition of providing a reasonable compensation therefor. The power we allude to is rather the police power, the power vested in the legislature by the constitution, to make, ordain, establish all manner of wholesome and reasonable laws, statutes, and ordinances either with penalties or without, not repugnant to the constitution, as they shall judge to be for the good and welfare of the commonwealth, and of the subjects of the same."

Justice Hill finally quoted the words of the Supreme Court of Maine in 1908, (103 Me 506); "While it might restrict the owner of wild and uncultivated land in his use of them, might delay his taking some of the product, might defer his anticipated profits, and even thereby might cause him some loss of profit, it would nevertheless leave him his lands, their product, and increase untouched and without diminution of title, estate, or quantity. He would still have large measure of control and large opportunity to realize values. He might suffer delay, but not deprivation. While the use might be restricted, it would not be appropriated or taken."

On February 18, 1949, the Supreme Court of Washington, with one dissenting vote, ruled in favor of the state and thus upheld the constitutionality of the forest practice act. A rehearing was denied on March 28. Finally, on November 7, the highest court of the land, the United States Supreme Court, upheld the state court decision.

Many will argue that the rights of the proponents of private enterprise, to handle their own forest properties as they please died or were started on a slow death by the decisions in the Dexter case. Others will say this is not the case at all; that private rights were not invaded, only restrained for their own and the public good.

Nonetheless, a precedent has now been set. The supreme court decision is a powerful ally in favor of similar regulatory acts. While these high-court decisions have occasionally been reversed, it is the exception rather than the rule. It looks like forest regulation is here to stay.

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"Law of the Land"

"The fundamental provision of law that the citizen shall not be deprived of his life, liberty, property or privileges, except by the law of the Land', that law which hears before it condemns, which proceeds upon inquiry, and renders judgement only after trial."—*Associate Justice Albert R. Savage, Supreme Judicial Court of Maine March 10, 1908 (103 Me 506)*

The Use of Rocky Mountain Species for Pulping[1]

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In the nine states of the Rocky Mountain empire, some 375 million cords of potential pulpwood are growing on 35 million acres of commercial forest land. Many of the tree species included in this volume are quite acceptable for the manufacturing of paper and paper products although only small portions of the timber have been used for making pulp. As regional population and the national demand for paper products increase, the Rocky Mountain region will supply more of the nation's future needs for pulpwood and paper and paper products by development of local manufacturing plants.

IT HAS BEEN SAID that the extent of the use of paper and paper products is one of the best indicators of the standard of living of any nation. This may be illustrated by the data on per capita consumption for the peak year of 1950. In the United States the consumption of paper and paperboard was approximately 380 pounds per person; in Europe it was about one-third as much, and in Asia and the Near East the consumption was less than three pounds per person. Although 1950 was a peak year for per capita consumption, the total consumption continues to increase in the United States and many other countries. As we provide more and more economic assistance to other nations it is only natural that their demands for paper and paper products will also increase. This increasing demand, particularly in our country, has resulted in research for the development of processes which would make possible the utilization of a greater variety of the species for pulp and paper making.

Features of the Rocky Mountain Region

The search for new sources of raw material has led to consideration of species growing in the Rocky Mountain region. Here the development of wood-using industries has lagged far behind other forest regions and, consequently, growth has exceeded drain. This lack of development is partially, if not entirely, because this region is sparsely populated and is characterized by vast areas of plains, deserts, plateaus, and high mountains. Inaccessibility, slow growth rates, small trees, and greater values placed on lands for water production, grazing, and recreation combine to make wood production of secondary importance.

In the nine states of the Rocky Mountain region, the U. S. Forest Service estimates that some 375 million cords of potential pulpwood are growing on 35 million acres of commercial forest lands (*12*). The total forested area in the region is about 126 million acres which is approximately 23 percent of the land area. Because of inaccessibility, much of the additional 91 million acres are non-commercial, indicating one of the principal draw backs to pulp mill development; namely, high initial outlay for roads.

Let us evaluate the suitability of the species found in the Rocky Mountain region for pulping. Certain economic as well as technical problems must be considered. The suitability of any species, chemically and physically, as a raw material is certainly of primary importance, but the unit cost of harvesting, transporting, and processing must be low enough to permit the finished product to compete on the open market. Bryant (*2*) states that the future development of the pulp industry depends very largely on whether an ample supply of cheap pulpwood will be available, but the importance of the several timber regions will depend not alone on whether the timber volume is present, but upon its size, quality, and accessibility. Equally important is the distance of the stands from centers of pulp and paper consumption, the transportation facilities to and from the consumption unit, and the competition for the timber resources from other industries or for other purposes. Nevertheless, the volumes of timber available in the Rocky Mountain region are indicative of possible future expansion, and the feasibility of a mill in Colorado must be tested against such expansion elsewhere.

A significant trend in the development of a Rocky Mountain pulp industry is the establishment of a sulphate mill (capacity 160 tons) at Lewiston, Idaho (*10*), and a semi-chemical mill (capacity 12.5 tons) at Phoenix, Arizona. In 1950, the Columbine Development Corporation of Grand Junction, Colorado, took an option on the 4,565,000 cords of pulp timber left in the wake of the spruce bark beetle and proposed to construct a large mill in western Colorado to utilize the dead timber. However, this option lapsed April 30, 1953. The most recent pulp mill in the Rocky Mountain area is the groundwood mill (capacity 25 tons) now being set into operation at Flagstaff, Arizona. In 1952, the Northern Rocky Mountain Forest and Range Experiment Station published resource information for a pulp-mill development east of the Continental Divide in Montana (*5*). Forest products research centers are working on the technological aspects of pulping regional timber. All these add to the evidence of the feasibility of using Rocky Mountain species for wood pulp.

Principal Trees of the Rocky Mountain Forests

The forests of the Rocky Mountains are comprised of relatively

[1]Presented at the annual meeting, Society of American Foresters, Colorado Springs, Colo., September, 1953.

few species. The major wood producing species are coniferous. These forest stands are largely restricted to high elevations or to water courses at lower elevations. The species are usually limited to life zones which have similar climatic conditions. The altitudes of the zones tend to decrease from the southern part of the region to the northern part. Life zones and altitudinal range are very convenient aids in describing tree distribution in this region which is so greatly diversified as to topography and climate.

The northern portion of Idaho and western Montana has five forest types. Lodgepole pine occupies the higher elevations with Douglas-fir and western larch slightly lower down. Engelmann spruce is also of considerable importance at the medium elevations. Ponderosa pine and western white pine are the major species at the lower elevations with western redcedar, true firs (lowland and alpine), western hemlock, and balsam poplar of minor importance.

The principal species in central Idaho is ponderosa pine with Douglas-fir, lodgepole pine, western larch, Engelmann spruce, western redcedar, true firs (white, lowland white, and alpine), and western white pine being the other timber producing trees.

Central Montana and Wyoming have extensive forested areas where lodgepole pine is the most abundant type. Douglas-fir, ponderosa pine, and Engelmann spruce are the other major forest types. The forests of the Black Hills are characteristically ponderosa pine. Other species of this northeastern Rocky Mountain area worth mentioning are alpine firs, limber pine, aspen, cottonwoods, Rocky Mountain juniper, and white spruce which are noted on basis of importance.

Engelmann spruce, lodgepole pine, and ponderosa pine are the important forest types in Colorado, Utah, and Nevada. Again ponderosa pine occupies the lower elevations and lodgepole pine and Engelmann spruce grow at the higher elevations. Douglas-fir at these lower latitudes is widely scattered and is found on the northern and eastern aspects of mountains. Aspen is located in patches and is found in extensive areas in the various forest types, particularly on the more moist sites. A type characteristic of dry areas at lower elevations is the pinyon-juniper. These trees are slow-growing and poorly formed. The areas of pinyon-juniper that are suitable for harvesting are very few.

The southern Rockies in Arizona and New Mexico illustrate the change in vegetation from desert plants up the slopes through heavily forested areas to the alpine shrubs and mosses. Ponderosa pine is by far the outstanding timber producing species at medium elevations with Douglas-fir, Engelmann spruce, and white, alpine, and corkbark firs being of secondary importance. Just as in areas to the north, the pinyon-juniper type is abundant below the ponderosa type. Mixtures of Mexican pinyon, pinyon, and singleleaf pines; and Utah, oneseeded, alligator, and Rocky Mountain junipers constitute the species found in this type.

Suitability of Rocky Mountain Species for Pulping

In reviewing the trees indignous to the vast mountain area, it is quite easy to recognize that several of the Rocky Mountain species are those heavily depended upon for pulpwood in other regions. Nearly all species are these softwoods which reduce to pulp easily. The pulp produced from these species has been found to be of excellent color and to meet a general classification of standard strengths (*11*).

Some technological variation in pulping processes may be necessary in order to handle some woods but none of these should cause undue concern to pulp technologists.

The pulp produced from Rocky Mountain woods has certain common properties, regardless of species. This analogy is possible because pulping processes are subtractive, and cannot impart properties to pulp not present originally in the wood. Therefore, with similar growing conditions which exist for large areas of the Rockies and certain species better adapted to these conditions than others, the similarity of pulps seems logical.

Species Suitable for Pulpwood

Western hemlock is the best all-around pulp wood in the region part of Idaho and northwestern part of Idaho and northweestern Montana. It is the predominant species used by the Inland Empire Paper Company (*1*). The wood is of good density, can be pulped by any process, and gives yields above other species. The pulps, both sulfite and kraft, have excellent strength and tear properties. The unbleached pulps tend to be slightly dark on the reddish side, but offer little resistance to bleaching. The pulp can be used for all high-grade papers.

The pulping of Engelmann spruce has been studied thoroughly by the Forest Products Laboratory during the last 10 years. Some Engelmann spruce pulpwood has been shipped to the Lake States mills since 1939. A mill in the Inland Empire uses a considerable amount of this species. The pulping characteristics of Engelmann spruce are similar to other spruces. The wood reduces readily and is relatively light in color intensity indicating an absence of tinctorial substances. The resin content is low; it has a moderately low density (19-20 pounds per cubic foot), and the fiber length is moderately long (about 3 mm.). Because of the many good properties, Engelmann spruce can be pulped easily by the sulphite, sulphate, and groundwood processes and is suitable for making a wide variety of papers (*8*).

Attention in recent years has been directed toward finding a satisfactory use for the wood of beetle-killed spruce. Experiments have been conducted and about 50 thousand cords of beetle-killed spruce are now being shipped annually to the Lake States. This wood pulps with facility and produces the highest quality pulp. There is a weakness in bleaching the lower-density wood. The tear-

ing strength is lower than pulp coming from green trees, although in comparison, the Engelmann spruce, whether kraft or bleachable grades, is equal or superior to those made from lodgepole pine or jack pine. Studies show that high-quality groundwood pulp can be made from Engelmann spruce, whether it is green or beetle-killed, and energy consumed and grinding characteristics are comparable to other eastern species (*8*). The uses would be the same as those of other high-quality spruce pulp.

The most abundant species and most widely used for lumber is ponderosa pine. A recent development in pulping this species has been the new 25-ton groundwood mill in the Southwest. The raw material will be principally ponderosa pine thinnings. Development of utilization of this kind will greatly stimulate timber management possibilities in the region.

Existing data reveal that ponderosa pine can be readily reduced to pulp by the kraft and groundwood processes but some difficulty is encountered in reduction by the sulphite process. The quality of the sulphite pulp is limited chiefly by dark color, resin content, and shiviness. On the other hand, the pulp produced by the sulphate process is of high quality. Tests showed that the lowest quantity of chemicals was sufficient to produce the maximum yield of screened high-strength pulp with only a small amount of screening rejects. Bleaching pulp was found to be sufficiently low in lignin content to develop satisfactory bleaching with a normal amount of chlorine. As a comparison, the sulphate pulping characteristics and strength of the pulps are similar to those of jack pine which is a pulpwood of satisfactory quality (*3*). Recent groundwood pulping tests show that a standard quality newsprint and book paper can be made from ponderosa pine thinnings when mixed with the usual amount of chemical pulp.

Lodgepole pine, a species of the cooler elevations of the Rocky Mountains, is quite suitable for pulpwood. In recent years, about 100,000 cords have been shipped annually to the Lake States. Tests and commercial practices show that the wood can be readily pulped by all processing methods. The sulphate pulp, which is adaptable for more resinous woods, is strong and quite suitable for high-grade wrapping paper and container board. The pulp is bleachable. Studies of pulping green and the sound dead woods reveal similar pulping characteristics and nearly the same pulp yields and pulp strengths. Dead wood with decay pulps more readily than sound wood but, as one would expect, has a poorer color and lower strength (*6*).

The sulfite process produces a pulp of excellent color, strength, and readily bleached, but is somewhat more pitchy. The groundwood pulp produced is of excellent color and satisfactory strength. Some experiments show that the color is comparable to pulp produced from white spruce. A comparison of lodgepole pine and jack pine reveals comparable qualities with green lodgepole pine highly desirable (*6*).

Douglas-fir (mountain type) should not be overlooked as a possible source of pulpwood. It is second only to ponderosa pine in abundance in the region. The wood properties present some difficulty in pulpings. The uneven texture results in two distinct fiber types; heartwood is a dark reddish-orange and the high resin content adds to the difficulty of pulping. The sulphate process is used commercially for Douglas-fir on the coast. The other conventional processes are not suitable. The Douglas-fir pulp that could be produced from the Rocky Mountain variety would, no doubt, reveal unusual strength characteristics. The color of the unbleached pulp would not be too good but the pulp could be lightened by the reduction-type bleaches (*4*). Several laboratories are working on a variation of the conventional sulphite process, but no results to date can be considered for a commercial operation.

Western larch possesses similar wood properties to Douglas-fir and would undoubtedly have similar pulping characteristics.

Information on the true firs makes possible these comparisons. The groundwood pulps are comparable with other groundwood pulps though slightly lower in brightness. The paper-making tests showed them satisfactory for use in newsprint, but for book paper they need to be bleached. The strength of the sulphite is acceptable but a little lower than good quality spruce sulphite pulp. The true firs produce acceptable quality sulphate pulp (*3*).

Western white pine and western redcedar are species available in the Inland Empire for pulping. Studies reveal that both the woods reduce readily, with western redcedar having excellent strength properties and western white pine having values 10 percent below the average sulphate pulp. Color is a big handicap for the use of western redcedar (*4*).

At the present time it does not appear that the pinyon pines and the junipers will play an important role in pulping. Pinyon pines are highly resinous and the stems are knurled and knotty, while the junipers contain a considerable amount of oil and have poor color.

Aspen and a few other species of Populus are the only hardwoods in the region worth considering for pulping. The amount of wood available would not be great except in a limited number of areas. The use of aspen undoubtedly would follow future developments. Research thus far conducted on the pulping of the Rocky Mountain aspen indicates this wood pulps as well as aspen grown in the Lake States (*3, 9*). A mixture of aspen pulp with the other native softwood pulps will make acceptable products if aspen is not used in quantities greater than 25 percent.

Conclusions

There seems to be little doubt that definite possibilities exist for increased utilization of Rocky Mountain species for pulp from a technological standpoint. The sulphate and semi-chemical processes have the advantage in this region

elmann spruce grow at the higher elevations. Douglas-fir at these

erties to pulp not present originally in the wood. Therefore, with

There is a weakness in bleaching the lower-density wood. The tear-

because all the common species can be readily reduced by these processes. The major obstacle to the use of Rocky Mountain species appears to be one of economics. In the past the low demand from the sparse population has been a principal reason for the lack of local production of pulp. Furthermore, the use of the timber of the region to supply pulpwood to areas of greater demand was precluded by the existence of low-cost timber nearer and more accessible to those markets. Changes noted in these same two factors foreshadow the future developments for the region. First of all, population in the Rocky Mountain area has increased by one and one-third million people since 1930 and the trades and industries have expanded similarly. Secondly, timber supplies for pulpwood formerly found nearer the major markets have been dwindling in spite of advances in forest management practices. Consequently, the Rocky Mountain area has been and will be looked to for further supplies.

At the present time the number of potential new units that can be added to the national industry appears to be limited. But the continued elimination of processing difficulties, together with the increasing regional demand for paper products, will undoubtedly lead to the further establishment of pulp and paper enterprises in the Rockies. If this should be the result, management of the Rocky Mountain forests will be relieved of a situation of continued uneconomical protection from insect, fire, and disease.

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USDA Extends Definition of Farm or Ranch to Include Tree Farms

Under the authority vested in the Secretary of Agriculture, Section 13 (h) of the Soil Conservation and Domestic Allotment Act has been amended by adding the following paragraph to the definition of "farm" or "ranch": "Notwithstanding any limitation of this definition (paragraph) concerning the type or use of land, a farm may include or may consist entirely of woodland which is being operated for the production and sale of forest products." This action was taken on March 26, and should be of interest to small woodlot and small forest owners who devote most of their land to the growing and selling of forest products.

pulpwood. In recent years, about would undoubtedly have similar have the advantage in this region

Suitability of Rocky Mountain Woods for Veneer and Plywood[1]

I. V. Anderson
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SOFTWOOD PLYWOOD production began on the North Pacific Coast in the early 1920's and was confined almost entirely to Douglas-fir. Just before the big depression began in 1929 Douglas-fir plywood production amounted to about 350 million square feet per year. In spite of the depression the industry continued to grow, until by 1940 it had increased to 1.2 billion, and last year the production was in excess of 3 billion square feet. The industry was founded on large logs of high quality. Today the trend is toward much smaller logs and closer utilization. Technological developments have made it possible to get excellent quality material out of small diameter logs. Probably an extreme example of this is the utilization of 6-inch western paper birch during the war by a company at New Westminister, British Columbia. In the Rocky Mountain area the industry must look to smaller sizes for its raw material because the timber just does not grow as large as on the Coast.

Species and Volume

It is rather difficult to name the species in their order of importance and value for veneer and plywood. However, on the basis of test results and current and potential market possibilities, the various species could be placed in approximately the following order: western larch (*Larix occidentalis*), western white pine (*Pinus monticola*), ponderosa pine (*Pinus ponderosa*), Engelmann spruce (*Picea engelmanni*), Douglas-fir (*Pseudotsuga menziesii*), and miscellaneous species.

Some of the junipers possess qualities for sliced veneer, and in addition there are two hardwoods — cottonwood and aspen — that must be considered. Peeler logs and slicing flitches must be produced from stands of sawtimber size with the exception of junipers, aspen, and white or paper birch. Hence, it is of some value and interest to know the total volume by species of these potential veneer woods. Table 1 presents data for the Rocky Mountain woods and includes the states of Idaho, Montana, Wyoming, Utah, Colorado, Nevada, western South Dakota, Arizona, and New Mexico.

The total volume of a potential veneer and plywood species may sometimes be misleading as to the availability of material for a veneer and plywood industry. There are several considerations that must be weighed along with the volume. They are:

1. The number of large operations in a given utilization area controlling virgin stumpage and capable of integrating production of veneer and plywood with their lumber operation.
2. Suitability for rotary or sliced veneer.
3. Character and quality of individual stands under consideration—some timber stands might contain as much as 30 percent of veneer logs while others contain none.
4. Timberland ownership pattern, whether public or private.
5. Commitments of sawmill operators for select shop lumber—ties, timbers, and other specialty items.
6. Possibility of trading sawlogs for higher quality peeler logs and slicing flitches.

Since each of the species contained in Table 1 possesses variable characteristics it is probably best to analyze their suitability, species by species.

Suitability by Species

Western Larch

Western larch is suitable for both rotary and sliced veneer. Laboratory tests (*3*) were first made to determine the value of western larch for rotary cut veneer at the Forest Products Laboratory in 1940. The results were very satisfactory. Then in 1942 the U. S. Plywood Company became interested and made a series of factory tests at its plant in Seattle. Again, the results were satisfactory. Through their cooperation with the Polson Lumber Company, Polson, Mont., tests to determine the properties of western larch for sliced veneer were made in 1950. As a result of these and other tests both rotary and sliced western larch veneers are now in production at the Potlatch Forests Industries' plant, Lewiston, Idaho, and the Polson Lumber Company, Polson, Mont. There is also a new slicing plant now in operation at Post Falls, Idaho.

It has been found that larch has excellent lathing properties and can be cut cold to veneer thicknesses of up to 1/8th of an inch that are reasonably free from checks. It was found at the Madison Laboratory that heating of the bolt before peeling increased the tightness of the veneer. They were able to cut 1/64-inch veneer of satisfactory quality without any particular difficulty. Factory tests run by the U. S. Plywood Company cut the veneer into 1/10-inch thickness and it was processed into 5/16 rough plywood. They found little or no difficulty in cutting this species cold.

Many western larch logs contain what has been termed internal sapwood arranged in alternate concentric rings from the pith to the sap. When a knot-free flitch of this material is sliced in a radial direction a beautiful ribbon-grain pattern veneer is produced. This kind of material is available in western larch in 6-, 8-, and 10-inch widths, and occasionally a 12-inch cant could be produced.

Larch slices smoothly and readily into 1/16-inch veneer. One factory test gave a recovery of 13 to 1. One-sixteenth inch sliced veneer dries in a roller drier in 12 minutes at a temperature of approximately

[1]Presented at the annual meeting, Society of American Foresters, Colorado Springs, Colo., September, 1953.

325° F. This veneer is then ready for processing in the usual manner with Diehl splicing and gluing equipment. Sliced larch makes a specialty product that could probably compete in the market with certain classes of figured hardwood veneers. It has a pleasing appearance when worked into wall panels or for facing of flush doors. The ribbon grain or striated effect is very similar to that produced by Philippine mahogany, except that the color is more nearly that of yellow birch.

The yield of rotary cut western larch is not as high as yields in the Douglas-fir mills of the Coast, principally because smaller logs must be used. However, the growth habit of western larch, which produces clean, straight old trees, is conducive to the production of a great amount of knot-free material in the first two or three logs of the bole. Quite often small logs 16 inches in diameter are practically free of knots to a 3- or 4-inch core. Some of the earlier tests run on rotary cut western larch veneer indicated a recovery of 1,750 square feet of 3/8 inch rough plywood, net measurement per thousand feet of peeler bolts processed. This would compare to approximate recoveries of about 2,000 or 2,300 square feet of 3/8-inch rough plywood in the Douglas-fir industry per thousand feet of logs.

It is practical to select peeler logs from virgin western larch stands that will give a net recovery of from 40 to 50 percent clear veneer suitable for face stock.

There are no particular problems in the drying of western larch veneer, except when compared to Douglas-fir it contains more moisture. The average moisture content of western larch peeler logs would run between 50 and 60 percent. Larch also has another characteristic in that it contains concentrations of heavy moisture content in streaks ranging from ¾ of an inch to 2½ inches in width, and often 18 inches in length. Such streaks, when encountered in cutting under pressure of a pressure bar, are extremely sensitive to pressure application and sometimes cause a distortion in the dry veneer. This material, however, can be readily clipped out at the clipper.

Larch also contains a concentration of a water soluble sugar called galactan (5). When the logs are soaked or steamed much of this material seems to disappear. However, when they are cold-cut it comes out in the form of a whitish, crystalline exudation on the veneer after drying. This material does not seem to affect the gluing properties of the veneer. It is readily sanded off but a more open-coated sandpaper must be used in the sanders. Some of the larch logs often contain as much as 15 or 20 percent of galactan by weight. This is water soluble and might have considerable possibilities of utilization for a by-product from western larch veneer production.

Experience to date in the production of western larch veneer indicates that it has excellent finish properties, sands readily and glues well. Western larch veneer compares favorably with Coast Douglas-fir in strength. Studies (6) at the laboratory indicate that western larch has an average tangential shrinkage of 6.05 percent.

There would be numerous western larch plywood and veneer plants in the Northern Rocky Mountain region if western larch peeler logs were readily available. The principal drawback to expansion of this industry is the difficulty in developing a stable supply of peeler logs. There are no timber stands available for purchase that would furnish a sole peeler log supply for an economic plant. There are, however, substantial volumes of larch stumpage that can be purchased in sufficient quantities to furnish a good "backlog" for at least half the peeler requirement of such a plant. Many of the Douglas-fir pilot plants on the Coast use up to 40 or 50 million feet of peelers annually. Due to the limitations in supply of western larch it does not appear practical for a plant to accumulate more than 3 to 5 million feet of peelers annually. Should an operator wish to install a slicer it would not be too difficult for one to procure probably 750,000 feet of cants per year which would make a nice operation.

There are numerous tie mills in the Northern Rocky Mountain area now producing railway ties from western larch. These mills should be a good source of peeler logs. Experience to date has indicated that western larch can be profitably peeled down to a 16-inch diameter provided that the smaller logs are absolutely surface clear. Since there are no open log markets in the Northern Rocky Mountain area no commercial larch peeler log specifications are now in effect. Tentative specifications (2), however, have been drawn up for a number of years and are available.

TABLE 1.—VOLUME OF ROCKY MOUNTAIN TIMBER CONTAINING SOME MATERIAL SUITABLE FOR VENEER AND PLYWOOD[1]

	Engelmann spruce	Western larch	Douglas-fir	Ponderosa pine	Western white pine	Black cotton-wood and aspen
	Million bd. ft.	*Million bd. ft.*	*Million bd. ft.*	*Million bd. ft.*	*Million bd. ft.*	*Million bd. ft.*
N. Rocky Mt. Region	12,499	17,879	26,718	26,771	12,630	936
S. Rocky Mt. Region	15,361[2]	——	3,470	26,865	——	916
Total	27,860	17,879	30,188	53,636	12,630	1,852

[1]Gaging the timber resource of the United States. Report 1 from a reappraisal of the forest situation, U. S. Dept. Agric., Forest Service. 1946.
[2]Probably reduced at least five billion feet by recent insect infestation.

Ponderosa Pine

Ponderosa pine rotary veneer has been manufactured for about 30 years on a commercial basis. The Red River Lumber Company of Westwood, Calif., started manufacturing ponderosa pine plywood in the early 1920's. The next plant

to produce this species was the Kalpine Company at Klamath Falls, Ore. Hence the production methods and market acceptability for this species has been pretty well proven. There have, however, been numerous laboratory and factory tests made of this species to determine its properties for veneer production. In 1947 the Forest Products Laboratory at Madison made tests (*6*) to determine the various temperatures and knife angles suitable for producing the best veneer. However, it has never proven commercially economical for operators to steam or heat their logs before cutting, hence all current commercial operations rotary "cold cut" ponderosa pine.

Recent slicing tests by the Polson Lumber Company, Polson, Mont., have indicated that a very satisfactory ponderosa pine knotty veneer can be cut and successfully dried. This material was cut in 1/12- and 1/16-inch thicknesses and the knots presented no problem.

The clear wood of ponderosa pine contains no particular pattern, hence there is no special advantage gained by radially slicing the material. It does, however, slice readily. In the event knotty Idaho white pine veneer became scarce ponderosa pine knotty veneer could well be used as a substitute.

The recovery of rotary cut veneer from ponderosa pine is considerably under that of Douglas-fir. Commercial recovery of 3/8 inch plywood per 1,000 feet of peeler logs used is about 1,800 square feet. This compares to a recovery of 2,000 to 2,300 feet in the Douglas-fir plywood industry. Since the sapwood of ponderosa pine often contains as high as 140 percent moisture content as compared to 55 percent in the heartwood, some plants (*7*) separate veneer from sapwood and heartwood for drying purposes. It takes about three times as long with higher temperatures to dry veneer from sapwood as it does heartwood veneer. However, no particular difficulties have been experienced in the drying of ponderosa pine veneer, either rotary or sliced. It is, however, more costly to dry than Douglas-fir, or even western larch, because of the longer drying schedules that are involved. For instance, one plant in the Northern Rocky Mountain area put 1/6-inch ponderosa pine sap veneer through the drier in 33 minutes at a temperature of 300° F. One-sixteenth inch ponderosa pine sliced knotty veneer can be dried down to a moisture content of 5 or 6 percent in 12 minutes at a temperature of around 325° F. in the roller drier.

In the finishing of rotary cut ponderosa pine plywood pitch concentrations are sometimes encountered and this causes plugging of the paper. This is overcome by using a more open-coated paper than is used for Douglas-fir. Both sliced and rotary cut ponderosa pine veneer take paint or finish very well, except if unusual concentrations of pitch are encountered then paint troubles result.

Like western larch, were the amount of ponderosa pine peelers available there would be numerous veneer and plywood plants in the Rocky Mountain country. However, such is not the case. Most of the large virgin stands of ponderosa pine are now quite closely controlled for lumber production. Select ponderosa pine lumber is now bringing about $230 per thousand wholesale. Hence, one can readily see why it is difficult to accumulate a sufficient supply of peeler logs for a veneer and plywood operation.

The virgin stands in the Rocky Mountain region contain from 5 to 30 percent of their volume in peelable logs. A good stand would average about 15 percent of the logs suitable for peelers. Probably not over three lumber concerns in the Rocky Mountain area have large enough holdings to divert a sufficient amount of ponderosa pine logs to sustain a small plywood operation. Even then it is questionable if they could hold their old lumber clients by diversion of as much as 20 percent of their high-grade logs for peeler without a consequent reduction in select lumber recovery that would cause dissatisfaction among their old customers. The best opportunities probably exist in western Montana and northern Idaho where western larch would be available along with the ponderosa pine. Here, I think there is a possibility for two or three plants using approximately 8 million feet of peelers annually consisting of half of each species. If ponderosa pine knotty sliced veneer could be popularized a substantial supply of flitch material could no doubt be developed from second-growth stands that have a high percentage of sound knotted material.

Western (Idaho) White Pine

Even though a small amount of western white pine rotary cut veneer has been made for the last 30 years there is very little being made at the present time. The reason is that there is a comparatively small volume of virgin growth available containing good peeler logs, plus the fact that white pine select lumber is selling for almost a fantastic figure. At the present time there are a few clear cants sliced and used for facing of cupboard stock and other similar material. Commercial practice and laboratory tests (*7, 8*) have indicated that cold cutting of western Idaho white pine rotary veneer is practicable.

The yields of veneer are approximately the same as those obtained from ponderosa pine. There are no particular drying problems that have been encountered and not overcome. Since Idaho white pine contains a higher initial moisture content than ponderosa pine longer drying schedules are necessary. Rotary cut western white pine veneer has always been highly desirable for cross-core material in the manufacture of hardwood plywood and flush doors. It acts as a cushion and does not show defects through the thin-faced veneer since it is quite soft. Knotty white pine veneer for panel faces has been popular in recent years. The U. S. Plywood Company have been manufacturing it in their Seattle plant for about 10 years. There are sev-

[2]Probably reduced at least five billion feet by recent insect infestation.

eral other operators now manufacturing the same product (*7*).

The cants (*1*) for knotty Idaho white pine sliced veneer are usually produced from logs containing a high percentage of No. 2 common lumber. These logs come from close-grown mature, but not overmature trees. Cants are usually squared and come in sizes of 6, 8, 10, and 12 inches. One operator steams cants for a period of about 15 hours at a constant temperature of 138° F. before slicing. Most of the veneer is sliced in thicknesses of 1/16- and 1/12-inch. However there is a substantial amount made in 1/20 and 1/24-inch thickness. This veneer is dried on a standard roller type of drier and presents no particular problem.

White pine has long enjoyed an excellent reputation for its finishing properties and paintability. Hence this species profits from this reputation.

Availability of peeler material is quite similar to that of ponderosa pine and western larch except that there would be lesser amounts of western white pine peelers available than either of the other two species. However, procurement of cant material for slicing presents fewer problems than procurement of peeler logs. Approximately 25 sizeable sawmills are cutting western white pine in north Idaho, western Montana, and central British Columbia. Even though there is no open market for sliced cants the material can be purchased from these producers at prices competitive with the lumber these cants produce. The mills naturally demand a premium over what they would receive for the lumber produced from the cants.

Engelmann Spruce

At the present time there is no rotary cut veneer being produced on a commercial scale from Engelmann spruce. However, there have been both laboratory (*4, 8*) and commercial tests of this species. In both cases it is indicated that Engelmann spruce handles satisfactorily on the lathe. It can be cut readily in thicknesses of 1/6-1/16 of an inch without developing severe lathe checks. Heating of the bolts is not necessary so they can be cut cold with wood results.

Engelmann spruce trees have a comparatively small amount of clear length to the bolt and the clear wood is not very deep radially. Hence, yields of clear knot-free veneer are low compared to ponderosa pine, western larch and western white pine. At this time it does not appear practical to consider Engelmann spruce as a source of peeler stock throughout any portion of its range. However, Engelmann spruce trees contain numerous small sound knots so the average run of logs produces a high percentage of No. 2 common logs. These knots offer no problem in slicing and very few loosen and fall out during drying. These characteristics make Engelmann spruce particularly desirable for production of slicing cants (*4*). One operator in the Northern Rocky Mountain area has been producing sliced knotty veneer from Engelmann spruce successfully for several months. The cants are steamed for approximately 48 hours at 140° F. temperature. The material is sliced 1/12 inch thick and dries readily on a conventional roller type drier and presents no great problems.

No other species in the Rocky Mountain area possesses more faforable possibilities for production of a stable supply of slicing cants than Engelmann spruce. A log must be cut or opened up before a good slicing cant can be identified, hence this material must originate in the sawmill. This year the sawmills throughout the range of Engelmann spruce in the United States and British Columbia will produce approximately ½ billion feet of Engelmann spruce lumber. Informed individuals have estimated that at least 50 million feet of this material would be suitable for production of slicing cants provided the logs were segregated and sawed properly. This would supply a big potential veneer slicing industry—probably more than the market could absorb unless introduced under proper trade extension methods. About 1 million feet of cants will provide faces for from 6 to 8 million square feet of knotty plywood panel.

Douglas-fir

This is the mountain or so-called Inland variety of Douglas-fir. Throughout its Inland range Douglas-fir trees produce little or no select knot-free lumber. Hence the production of rotary cut veneer for face material is not practical. It does, however, produce excellent material for crossbanding since the knot cut readily on the lathe without steaming or other treatment. Furthermore, they seem to hold well in the veneer during the drying process. Douglas-fir is also one of the lowest value species in the Rocky Mountain area so is a good, cheap source of material for crossbanding.

Since the Inland variety of Douglas-fir is usually quite open grown it contains a relatively high proportion of sound red knots. Also, like western larch, the occurrence of internal or light colored sapwood bands is high. When sliced radially this material should make a beautiful ribbon-grained pattern, but additional study is necessary to verify this possibility.

Miscellaneous Species

Western black cottonwood (*Populus tricocarpa*) has been used for face veneer in cabinet panels and container stock for the past 30 years, hence its commercial use has been proven to a considerable extent. Tests made by the Forest Products Laboratory in 1948 indicate that it is practical to expect selected logs to yield approximately one-half of the veneer suitable for face stock. There does not appear to be any advantage to slicing cottonwood unless it is sliced for container veneer. Cottonwood is scattered in stringers throughout the river bottoms, hence a supply is very difficult to consolidate.

Narrow leaf cottonwood (*Populus augustifolia*) from the Yellowstone Valley in eastern Montana was tested for its rotary veneer making possibilities by the Forest Products Laboratory in 1948. This species produces a lower quality

veneer than black cottonwood, but indications are that some of the difficulties could be overcome if a sufficient supply of the material was available. However, like black cottonwood, the supply is very scattered and difficult to bring together in sufficient quantities to make an operation economic.

Another species quite universally distributed throughout the Rocky Mountain area is aspen. Aspen cuts on a rotary lathe quite similar to basswood and makes good veneer whether cut hot or cold. Aspen veneer can also be cut very satisfactorily on high-speed slicers. Drying presents no problem and gluing properties are excellent.

Although sizeable volumes of aspen that can be economically logged are much more frequent than cottonwood, accumulation of commercial amounts of aspen present quite a problem in the Rocky Mountain area. The state of Colorado probably has the largest volume available for veneer conversion purposes. A few years back Burst-Forster-Dixifield Company of Minnesota made a survey throughout the entire western range of aspen. They were looking for aspen suitable for converting to veneer for production of cut matches. The survey indicated Colorado to be the best source of aspen for this material so they located at Mancos, Colo.

White birch also occurs throughout the northern part of the Rocky Mountain area. Tests made of this species indicate that it lathes quite similarly to its eastern counterpart in the Northeast and in the Lake States.

During the war a spectacular use of western paper birch was developed at Pacific Veneers Company at New Westminster, British Columbia. Here it was cut into very thin veneers, sometimes 1/90 of an inch in thickness, and was used for plywood in the skin-stressed fuselage covering of the British Mosquito bomber.

There is a sufficient supply of paper birch in the northern end of the Panhandle of Idaho and northwestern Montana to supply one or two small operations.

Several of the Rocky Mountain junipers have contrasting colored woods and patterns that are attractive for cabinet work and miscellaneous wood items. The Forest Products Laboratory recently tested alligator juniper from Arizona for rotary veneer. The defective character of the bolt material and low veneer yield indicated that the various junipers are probably not promising species for large scale veneer production. However, they are admirably adapted to specialty uses since the wood glues readily and finishes easily in beautiful patterns.

Summary

The Rocky Mountain species now in commercial production for veneer and plywood are ponderosa pine, western larch, western white pine, and Engelmann spruce. Mountain Douglas-fir is used to a very limited extent for crossbanding. Aspen is now used for veneer matches. There is no commercial use for white birch or any of the junipers for veneer and plywood.

Probably the greatest possibility for expansion for commercial production is in the sliced type of knotty or figured veneer for panel faces. Idaho white pine excels for this purpose and is now displacing the board type of paneling to a certain extent. Ribbon-grained sliced western larch and Douglas-fir veneer possess excellent possibilities for future commercial expansion. A substantial volume of Engelmann spruce becoming more and more available in the next few years gives this species a high potential for expansion in the field of knotty paneling.

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Spread and Intensification of the Littleleaf Disease of Pine

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THE LITTLELEAF DISEASE causes serious losses in shortleaf pine (*Pinus echinata* Mill.) stands in many areas in the Southeast. The disease was first reported from two localities in Alabama in 1934. Siggers and Doak[2] made preliminary surveys and in 1940 reported that the disease was widespread in Alabama, Georgia, and South Carolina. Extensive roadside scouting since that time shows it to be widespread in a crescent-shaped area extending from central Virginia to northeastern Mississippi (Fig. 1). The finding of littleleaf over this wide belt does not necessarily imply that the disease has spread from the original known center in Alabama to embrace the whole Piedmont.

Copeland[3] reported a relationship between the distribution of littleleaf and soil types, the disease being worse on soils that have poor internal drainage. Campbell[4] found the parasitic root fungus *Phytophthora cinnamomi* in the soil around shortleaf pine trees in the Southeast. He also reported[5] that this fungus attacks the fine roots of shortleaf pine. Soils with poor internal drainage are well adapted to the development of this fungus. The occurrence of littleleaf is associated with both soil type and the presence of *P. cinnamomi*.

Both large and small areas of shortleaf pine free of littleleaf are found within the littleleaf belt. Areas of this type may be adjacent to badly affected stands. Likewise, stands of badly affected shortleaf pine may be found within relatively disease-free areas. Some stands show evidence of the disease at about 20 years of age, while others may remain healthy until they are 50 years or more old, depending in part on the soil type.

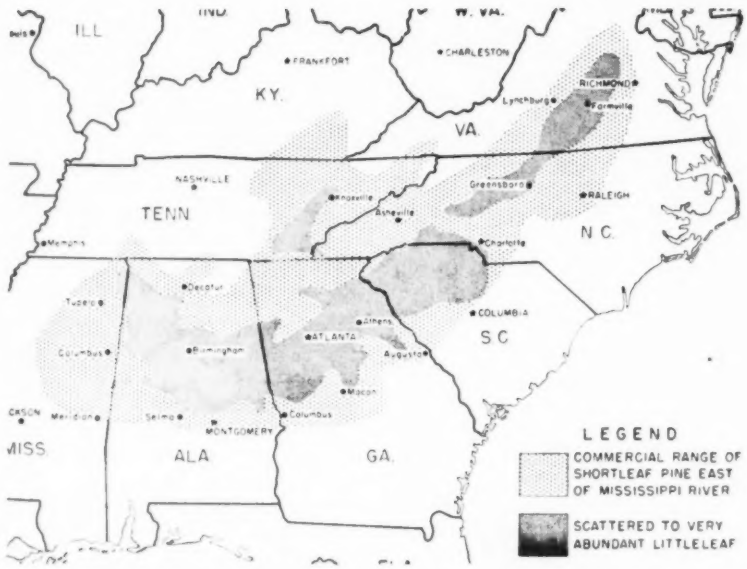

FIG. 1.—Map showing commercial range of shortleaf pine east of the Mississippi River and the crescent-shaped area in which littleleaf is found.

Information was needed on the behavior of the disease in affected areas and in healthy areas nearby or farther removed from littleleaf areas. Studies designed to furnish this information were initiated in 1940. The results of these studies through 1951 are reported here.

Study Plots[6]

In 1940 and 1941, thirty-four 4/10-acre permanent plots were established within the littleleaf belt for study of the development and intensification of the disease. Nine of these plots were established in essentially healthy stands. On the remaining 25 plots, diseased trees were present at the time of plot establishment. Three of the 34 progress plots were inadvertently cut over after they were established and are not included in the results.

In addition to these plots, 5 large areas containing from 800 to more than 1,200 acres were carefully mapped and examined to provide a basis for observing the spread of littleleaf. These areas were selected because the amount of littleleaf on them was relatively small and they were adjacent to littleleaf-free areas at the time they were established in 1942.

Data for the progress plots are presented in terms of a *plot severity index*. This index and the individual tree ratings were described in earlier reports.[7,8] The index is arranged on a scale such that a completely healthy plot would have an index of .00 and a plot with all trees dead of littleleaf would have an index of 1.00.

Results

Figure 2 shows the littleleaf history of each of the remaining 31 progress plots. Some of these plots were composed of healthy trees in 1941, which are still healthy 10 years later. Some healthy plots have become diseased, while still others that were diseased have be-

[1]Forest Service, U. S. Dept. Agric. Asheville, N. C.

[2]Siggers, P. V., and Doak, K. D. The littleleaf disease of shortleaf pines. U. S. Forest Service, Southern Forest Expt. Sta. Occas. Paper 95. 5 pp., illus. 1940.

[3]Copeland, O. L., Jr. Some relations between soils and the littleleaf disease of pines. Jour. Forestry 47 (7): 566-567. 1949.

[4]Campbell, W. A. The occurrence of *Phytophthora cinnamomi* in the soil under pine stands in the Southeast. Phytopathology 41 (8): 742-746. 1951.

[5]Campbell, W. A. *Phytophthora cinnamomi* associated with the roots of littleleaf diseased shortleaf pine. U. S. Dept. Agr., Plant Dis. Rptr. 32 (11): p. 472. 1948.

[6]Plots were established by T. S. Buchanan, formerly associate pathologist, Division of Forest Pathology.

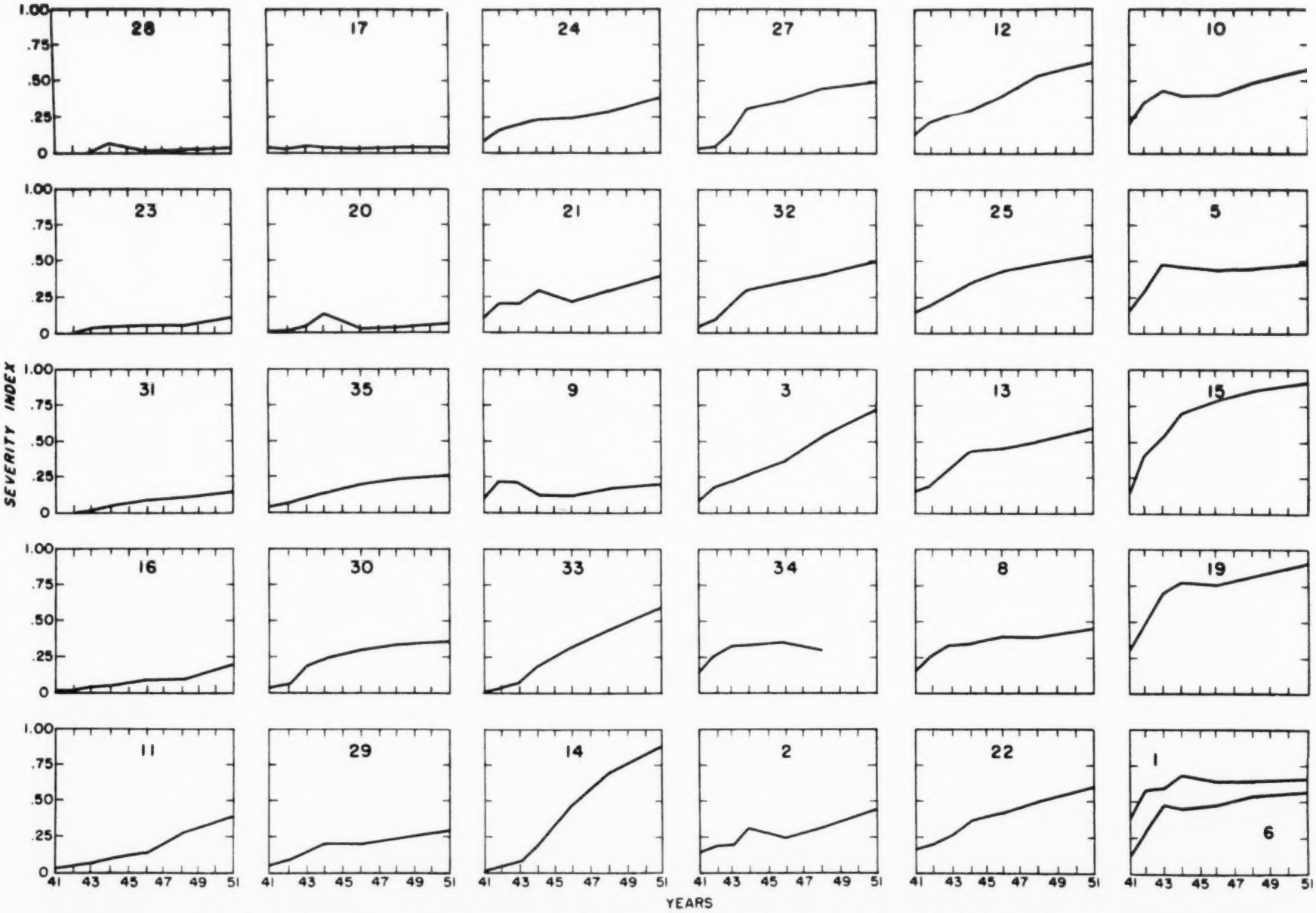

FIG. 2.—Development of littleleaf on permanent plots of shortleaf pine. (Numbers on individual graphs refer to plot numbers.)

TABLE 1.—LITTLELEAF SEVERITY RECORD ON 31 PERMANENT PLOTS FROM 1941 THROUGH 1951

Littleleaf intensity	Total plots	Total trees	Healthy trees to littleleaf[1]		Healthy trees	Moderate littleleaf trees to worse or dead[2]		Moderate littleleaf	Severe littleleaf trees to worse or dead[3]		Severe littleleaf
			Diseased	Dead	no change	Worse	Dead	no change	Worse	Dead	no change[1]
	Number	*Number*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Healthy plots (index .15 or lower)	4	164	14	2	86	...	...	...	0	0	0
Light littleleaf plots (index .16 to .30)	5	218	34	4	66	90	70	10	100	100	0
Moderate littleleaf plots (index .31 to .45)	7	275	51	8	49	89	46	11	100	88	0
Severe littleleaf plots (index .46 and over)	15	706	67	27	33	96	61	4	100	100	0
All plots	31	1,363	50	15	50	95	59	5	95	90	5

[1]Based on all healthy trees.
[2]Based on all moderately diseased trees.
[3]Based on all severely diseased trees.

come worse. Most plots that have had littleleaf for a number of years show a tendency for the rate of decline to level off, whereas most plots that have only recently become diseased do not show this tendency.

While Figure 2 shows some leveling off in the decline of the more severely affected plots, it also shows that there is a tendency for the disease to vary in severity from season to season. For example, some plots showed a leveling-off between 1943 and 1946, whereas there was a definite upswing in severity on some plots from 1946 through 1951. The upswing in plot condition index is evident both in plots recently diseased and in those that have been diseased for a number of years.

The number of trees upon which the points in Figure 2 are based may change from year to year, due to trees being killed by insects, trees being uprooted, or dying from causes other than littleleaf. The plot condition indices are based on trees that are still living or are known to have died of littleleaf. Small fluctuation in condition index from year to year are probably due to variations in estimates of needle length, needle color, or needle retention by different individuals due to weather conditions and light intensity at the time of the readings. Data were taken on all plots in the fall of the year after the trees had completed their growth and before shedding their 3-year-old needles.

In order to study the course of littleleaf on plots with varying degrees of the disease, the plots were grouped according to their highest degree of littleleaf over the 10-year period. In Table 1, the plots are divided into four groups. Group 1 includes plots that have never had an index above .15 and are therefore composed largely of healthy trees. Group 2 includes plots whose highest index was between .16 and .30; group 3 includes plots from .31 to .45; and group 4 includes plots .46 and above. The increase in condition index is due largely to healthy trees becoming diseased, rather than to the rate of decline of trees originally diseased. The rate of decline for moderate and severe littleleaf trees was about the same for all groups, but the percentage of trees developing littleleaf was 14 for group 1, 34 for group 2, 51 for group 3, and 67 for group 4.

Trees seldom improve after becoming diseased. Occasionally trees with early or moderate littleleaf symptoms seem to show some improvement from one observation period to another, but this is often due to variations in annual estimates by different individuals, improvement in appearance due to light conditions at the time of the estimates, or some other factors.

In areas where littleleaf is severe, shortleaf pine is gradually losing its place of dominance in the stand. On some areas most of the shortleaf pine has died of the disease and is being replaced by other pines or by hardwoods.

Not all littleleaf diseased trees react in the same manner. Some live for many years, while others die within a few years. Littleleaf development on the plots reported on in this study does not show the disease to spread from any particular infection center. Trees adjacent to trees dead of the disease

Table 2.—INTENSIFICATION OF LITTLELEAF ON 5 LARGE AREAS OVER A 10-YEAR PERIOD

Location	Littleleaf areas	New littleleaf areas				1942 areas larger in	1944 areas larger in	1946 areas larger in	1948 areas larger in
	1942	1944	1946	1948	1951	1944	1946	1948	1951
	No.	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*	*No.*
Colbert Co., Ala.	7	18	3	3	6	4	5	13	9
Camp Hill, Ala.	9	12	3	5	1	3	0	6	10
Newnan, Ga.	26	29	9	3	7	15	3	13	12
Gainesville, Ga.	11	18	3	12	3	2	8	7	4
Lexington, N. C.	11	38	13	7	3	7	27	14	10
Totals	64	115	31	30	20	31	43	53	45

[7]Roth, E. R., T. S. Buchanan, and G. H. Hepting. A five-year record of littleleaf on thirty-one plots. Forest Pathology Spec. Rel. 32. 9 pp. 1948.

[8]Roth, E. R., E. R. Toole, and G. H. Hepting. Nutritional aspects of the littleleaf disease of pine. Jour. Forestry 46: 578-587. 1948.

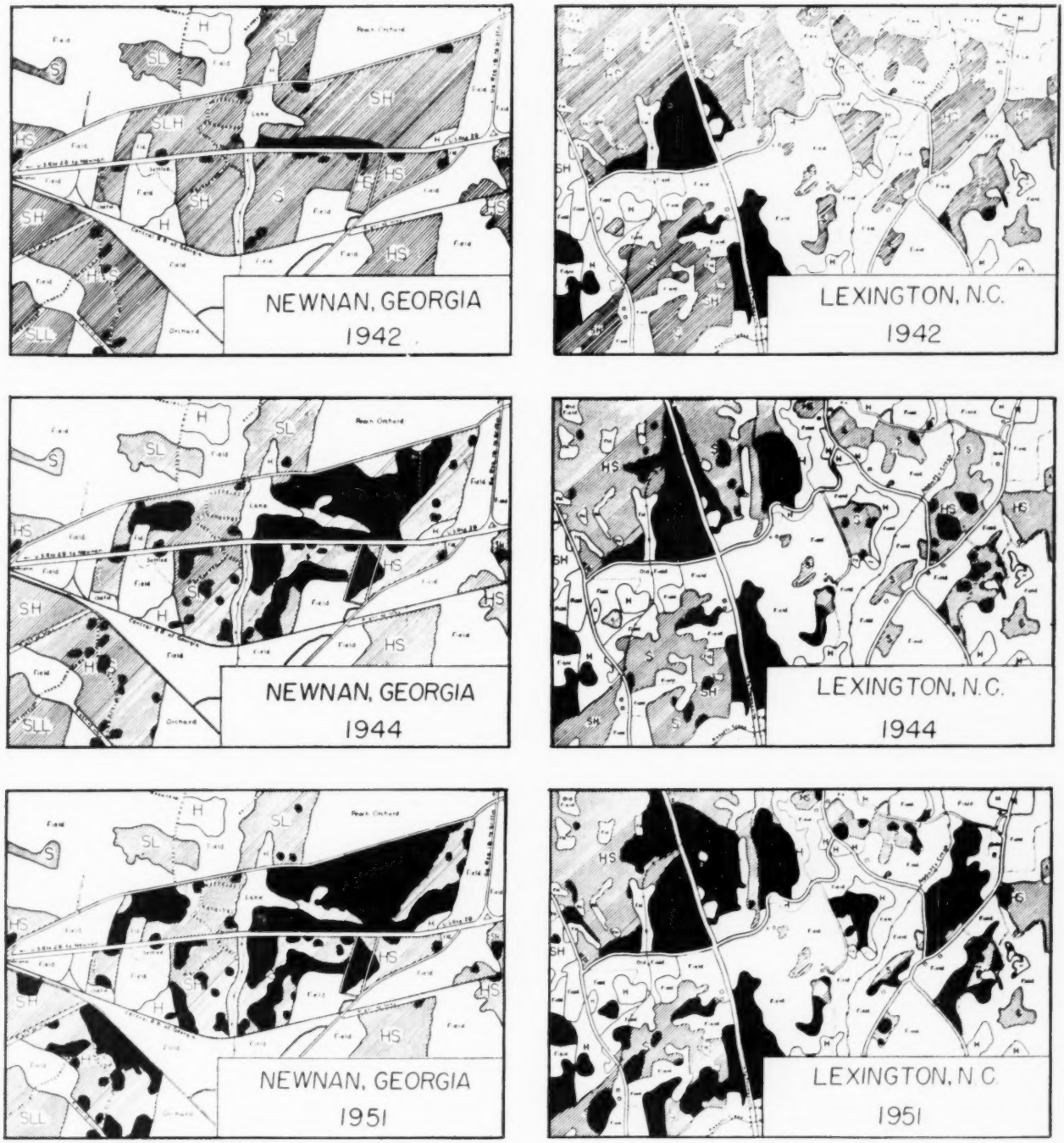

FIG. 3.—Location of littleaf trees on Newnan, Ga., and Lexington, N. C., spread plots in 1942, 1944, and 1951. Note that the greatest increase was from 1942 to 1944.

may remain healthy for many years, while trees far removed may be the next to die.

Local intensification of littleleaf on the plots just discussed is a somewhat separate matter from the spread of littleleaf into new areas. To study the latter point, five large shortleaf areas mentioned previously were chosen near Lexington, N. C., Newnan, Ga., Gainesville, Ga., Camp Hill, Ala., and Colbert County, Ala. These areas were located as nearly as possible at the edge of diseased areas and had a large proportion of their area free of diseased trees. With the exception of the Colbert County, Ala., area, which was somewhat smaller than the others, the areas were about 1.2 miles wide by 1.75 miles long.

At the time these spread study areas were established, type maps were prepared from aerial photographs.[9] The locations of littleleaf trees on each of the areas were plotted on the respective maps. Additional littleleaf trees appearing at examinations made in 1943, 1944, 1946, 1948, and 1951 have been added to the original maps. Figure 3 shows the spread of littleleaf on the area at Newman, Ga., and Lexington, N. C.

Since 1942, additional littleleaf has appeared on all the areas at each examination. The largest increase occurred from 1942 to 1944. This large increase in the two-year period indicates, as Figure 2 does for the permanent progress plots, that the incidence of littleleaf is greater in some years than it is in others.

Table 2 shows the initial number of affected trees in 1942 compared with later examinations. This table gives the number of new littleleaf locations at each examination with the exception of 1943, which was very similar to 1942, and also the number of diseased areas that have increased in size since the previous readings.

In Table 2, areas on opposite sides of main highways, although separated only by the highways, are considered as separate diseased locations. Contiguous areas on opposite sides of secondary roads or trails are listed as single spots. From the data presented in Table 2 and Figure 3, there is evidence that littleleaf is developing in new locations within the study areas and also that the original spots are getting larger in most instances.

Table 3 shows the approximate number of acres, together with the potential littleleaf acreage in each study area. Potential littleleaf areas are those locations where there is a fair proportion of shortleaf pine present in the stand. These areas at the time they were established ranged from 4 percent of the potential littleleaf acreage affected on the Newnan, Ga., area to 18 percent on the Lexington, N. C., area. It so happens that these two places show the largest increase in percent of potential littleleaf acreage diseased through 1951. The Newnan, Ga., study area has increased from 4 to 38 percent, an increase of 34 percent, and the Lexington, N. C., study area from 18 to 53 percent, an increase of 35 percent. Considering the 2,569 acres of potential littleleaf acreage on the 5 study areas, they have increased from 9 percent in 1942 to 31 percent in 1951.

[9] Aerial photographs furnished by the Soil Conservation Service, the State Extension Services, and local County Agents.

TABLE 3.—INCREASE IN ACREAGE OF LITTLELEAF ON 5 LARGE SPREAD AREAS OVER A 10-YEAR PERIOD

Location	Area in acres	Potential[1] littleleaf acreage	Littleleaf acreage affected in following seasons				
			1942	1944	1946	1948	1951
	Number	Number	Percent	Percent	Percent	Percent	Percent
Colbert Co., Ala.	800	688	5	10	12	15	20
Camp Hill, Ala.	1,224	346	9	14	14	17	21
Newnan, Ga.	1,154	525	4	26	27	34	38
Gainesville, Ga.	1,154	524	11	12	14	24	26
Lexington, N. C.	1,154	486	18	31	43	50	53
Totals	5,486	2,569	9	18	22	28	31

[1] Potential littleleaf acreage is that part of the area on which a fair proportion of shortleaf pine is present.

Summary and Conclusions

A study of the spread and intensification of the littleleaf disease of pine was conducted in the Southeast from 1940 through 1951.

Intensification of the disease was studied on thirty-one 4/10-acre plots located within the littleleaf belt, and spread was studied on 5 large areas of more than 800 acres each located close to the edge of diseased areas.

There is a tendency for the trees on some areas to be more severely diseased than others. The intensification of the disease varies from season to season.

Trees seldom improve after once becoming diseased. The rate of mortality increases with the severity of the disease.

In areas where littleleaf is severe, shortleaf pine is gradually losing its place of dominance in the stand, being replaced by other pines or by hardwoods.

Since 1942, many new littleleaf locations have appeared on all of the 5 spread study areas at each examination. The average increase in area with littleleaf on these plots was from 4 percent of the area in shortleaf types diseased in 1942, to 18 percent diseased in 1951.

All available data show that, except in isolated instances, littleleaf is not extending its range outside the littleleaf belt, as understood in 1942, but is becoming more serious in many places within the belt. In some locations the disease incidence remains rather constant, and some large areas within the littleleaf belt are entirely free of the disease.

Some Recent Developments in California Range Management[1]

M. W. Talbot
Associate director in charge Range Research, California Forest and Range Experiment Station, Berkeley.

EXAMPLES OF RESULTS from range research at the California Forest and Range Experiment Station illustrate how they might have significance in the management of forest lands. These illustrations also shed light on how the Range Division of the Society can be most useful to forestry.

Range Fertilization

The use of commercial fertilizers to build up production of foothill ranges has been studied at the San Joaquin Experimental Range since 1941, when Bentley's pioneering plots in this type of range fertilization were established. Stimulation of indigenous clovers through application of sulfur-bearing fertilizers has proved to be a positive method of improving the annual-plant forage on sandy loam soils of granitic origin in the Sierra Nevada foothills.[2]

The average yearly increase in total herbage production on one set of plots was 926 pounds per acre during three years following a single application of fertilizers. The first increase was chiefly in clovers. Both grasses and clovers increased conspicuously during the next two years. Hold-over response in forage growth for at least three years has been obtained consistently from a single application of sulfur-bearing fertilizer. The cost of the extra forage, about $3 a ton, is low. Improved quality of forage and less supplementing of dry forage are added benefits.

These results in stimulating the growth of native legumes are perhaps the most impressive of our findings from foothill forage studies. Rapid advances in research and field testing relating to other phases of the whole complex fertilizer field have also been made by the University of California, both Agricultural Experiment Station and Agricultural Extension Service, the Soil Conservation Service, and ranchers. Most of this advance has taken place in the last ten years. Prior to 1940 range fertilization by and large was deemed too costly to be practicable. The picture is reversing itself on foothill ranges; and even on high mountain summer ranges the practice is now feasible on selected sites.

Range Shrubs

The shrub problem in California is a veritable contradiction: too many shrubs—and too few. First, the problem of too many shrubs. In many localities brush conversion efforts are under way in the attempt to get rid of undesirable shrubs and trees. Especially vexing and important questions of land use pertain to the possibilities, limitations, and effects of converting brush-covered lands to more productive forms of plant cover—questions which comprise perhaps the No. 1 land-use problem in the state. Federal, state, and local agencies, along with many individuals, are working on it. The contribution of our Divisions of Range and Fire Research, in cooperation with the University of California, the State Division of Forestry, and National Forest Administration, has been chiefly in the broad areas of (1) brush removal on selected areas, (2) reseeding of cleared brushlands, and (3) control of sprouts. In this concerted cooperative attack much has been learned to guide future expenditures, but a host of vexing questions remain unanswered; e.g., the difficulty and cost of controlling reinvasions of brush sprouts, and the hydrologic and economic aspects of brush conversion and management. These questions center in the foothill zone of the Sierra Nevada and Coast Ranges but involve also sagebrush plateaus and the lower fringes of the commercial timber belt.

So much for the problem of "too much brush." How about the one of "too few shrubs?" Restoration of browse plants on big-game ranges by artificial methods is a recent challenge. A cooperative project, headed by A. L. Hormay, was undertaken last year at the request of the State Department of Fish and Game. The important point pertinent to this discussion is the changing situation in California that resulted in the establishment of this project; namely, the growing recognition of the need for more browse feed for deer—on critical winter ranges where bitterbrush (*Purshia tridentata*) and other palatable shrubs have been reduced or eliminated and where natural regeneration is unlikely for several decades. This problem is peculiar to forest ranges—and incidentally involves cattle and sheep as well as deer and antelope.

Reseeding and Weed Control

These two practices provide another example of developments in range management and in range research that further complicate sound handling of forest rangelands. Cornelius' work has shown that reseeding grasses on selected sites in the California region, as elsewhere in the West, affords a means of increasing the yield of forage from 3 to 13 times. The values obtained by reseeding will become more pronounced and permanent as progress is made toward increasing the amount of legumes in forage crops on mountain ranges. Similarly spraying big sagebrush and buttercup with selective herbicides has accelerated growth of residual bunchgrasses by 2 to 4 times.[3] Both of these valuable

[1]Presented at the annual meeting, Society of American Foresters, Colorado Springs, Colo., September, 1953.

[2]Bentley, J. R. and L. R. Green. Stimulation of native annual clovers through application of sulfur on California foothill range. In press. 1953.

[3]Cornelius, Donald R. and Charles A. Graham. Selective herbicides for improving California forest ranges. Jour. Range Mgt. 4 (2): 95-100. 1951.

range-husbandry practices set the stage for increased forage production and grazing capacity, but their full potential can only be realized when they are accompanied by vigorous well-planned grazing management geared to the needs and conditions of the particular area.

Proper range management involves many things. For example, high sustained production of perennial bunchgrasses, or tufted forage species which reproduce from seed, is dependent upon periodic resting of the range from grazing. This is a firm conclusion from grazing experiments carried out since 1936, at the Burgess Spring Experimental Range by A. L. Hormay on high-elevation summer ranges consisting of intermingled areas of timber, sagebrush flats, and meadows. So, again, sound range management must not only be geared to the growth requirements of the forage plants but must also be reconciled with timber management and watershed management. As management of wildland intensifies, closer coordination in the harvesting of its three main crops—water, timber, and forage—becomes more imperative. The hydrologic consequences of grazing, for example, have been only partially determined.

The Increasing Emphasis on Site

Rising population pressures on wildlands—forests, rangelands, and watersheds—with corresponding increases in costs of range improvement practices, all dictate the economic need to spend each improvement dollar where it will buy the most. Where is that? Obviously, on the classes of land offering most promise of success for the particular practice.

In our brushland improvement work one aim is to determine the kinds of land on which productive forage covers can be successfully established. Good covers have been established on soils typically associated with woodland-grass types of foothill vegetation. Spotty success has been attained on soils typically found with chamise-chaparral types; on shallow soils on steep southerly exposures results have been poor. The forage-producing capacities of the different soils are still to be measured. At higher elevations reseeding success demands a different formula of ground preparation and species mixture on soils supporting silver sagebrush (*Artemisia cana*) than on soils associated with big sagebrush (*A. tridentata*) or black sagebrush (*A. arbuscula*). Many other examples of the vital relation of site to wildland management could be cited from our results, and those of cooperators. A recent development is the Wieslander-Storie system of classifying wildland vegetation and soils, a cooperative project evolved jointly by our Division of Forest Economics and the Division of Soils, University of California.[4] Soil as a primary factor of site on forest ranges is commanding more and more attention.

In attempting to interpret recent range developments, in relation to the Range Division of the Society, several observations seem sound:

(1) The mounting interest in many aspects of range-land use and improvement reflects tensions between rapidly growing populations and land, which may be expected to continue to increase.

(2) The general situation has been changing so rapidly that we now have almost within our grasp the economic feasibility of doing many things that should be done with range land to maintain and build it up closer to its potential production of food and fibre.

(3) Already the need is clean cut for more intensive inventories, classification, ecological analysis, and follow-through management of range land.

(4) Equally obvious is the necessity for faster progress toward maximum obtainable coordination of range management, forest management, and watershed management on lands that grow both grass and trees.

The foregoing trends, it seems to me, reveal the broad outlines of the field of operation within which the Range Division can function most effectively and make its best contribution to the profession of forestry in the broad sense. To attempt to deal with the entire range and grassland field could not result in the greatest usefulness of the Division. Pursuant to this line of thinking, range-resource problems peculiar to treeless grasslands like the prairies, the Great Plains and large areas of semi-desert grasslands, would fall primarily within the purview of the American Society of Range Management and other societies whose spheres of influence are logically of broader territorial coverage.

A sound plank in the platform of the Range Division of the Society of American Foresters would therefore seem to be the devotion of most of its energy and action to problems of forest ranges which generally consist of intermingled tracts of grass, shrubs, and trees. Acceptance of this guiding principle will enable the Division to concentrate its efforts on problems of joint concern with "tree foresters." There is a real place in the Society of American Foresters for a vigorous Range Division to further the coordination of values and the balanced use of forest lands. This it seems to me is the most important service that the Range Division can render to the parent Society.

[4] Wieslander, A. E. and R. Earl Storie. The vegetation soil survey in California and its use in the management of wild lands for yield of timber, forage, and water. Jour. Forestry 50: 521-526. 1952.

A Guide Map to Locations of Interest to Foresters in the Lake States and Surrounding Territory

This outline map is designed as a general guide to places and activities in the northern mid-west that are of interest to foresters. It is a compilation of locations submitted by foresters working in the various states and includes a limited number of places of general or scenic interest in addition to those of significance from the standpoint of technical forestry.

A symbol is designated for each type of activity or development, and the name of the nearest town is given. Each town listed is numbered. The following descriptive material gives the number and the town by states, and a brief description of the activity designated by symbol on the map.

It is impossible to locate and describe every activity without unduly complicating the picture. Consequently, it must be kept in mind that this guide is neither exact nor complete, but includes only those locations considered to be of major interest. There are many places omitted that could have been included.

It should also be noted that the activities or developments listed are, in some instances, several miles from the town designated and there is no assurance that there will always be people available to guide visitors.

In several instances, where a particular type of forest industry may be concentrated within a restricted region, only one town is shown on the map and the fact that numerous similar activities are being conducted in nearby towns is mentioned in the descriptive note.

It is sincerely hoped that this map will be an aid to you in planning an interesting and informative trip.

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(See Guide Map on Pages 600, 601)

Illinois

1. **Cairo.** Horseshoe Lake State Game Refuge. Home of largest concentration of wintering geese in the United States.
2. **Jonesboro.** State Forest, hardwoods, northern natural limits of shortleaf pine.
   State forest nursery, production of both northern and southern pine.
3. **Harrisburg.** Headquarters, Shawnee National Forest.
   Kaskaskia Experimental Forest.
4. **Springfield.** Headquarters, Illinois Department of Conservation.
   State Capitol, Lincoln tomb and shrines.
5. **Petersburg.** New Salem State Park; reconstructed village of Lincoln's day.
6. **Topeka.** Mason State Forest and nursery; northern pine plantations.
7. **Oregon.** White Pines Forest State Park; southern natural limits of eastern white pine.
8. **Chicago Area.** Headquarters, Cook County Forest Preserve District; 35,000 acres of heavily used recreational forests.
9. **Grafton.** Pere Marquette State Park; Illinois' largest park at confluence of Illinois and Mississippi Rivers.

Indiana

1. **Cloverdale.** Cagles Mill State Forest and flood control project.
2. **Mitchell.** Spring Mill State Park.
3. **Jasper.** Numerous wood-using industries.
4. **LaFayette.** Purdue University Department of Forestry.
5. **Indianapolis.** Headquarters, Indiana Department of Conservation.
   State Capitol.

Iowa

1. **Forest City.** Pilot Knob State Park; oak wilt devastation, oak wilt research.
2. **McGregor.** Yellow River State Forest; oak, hickory, basswood. State operated sawmill, Indian Mounds, scenic Mississippi River.
3. **Strawberry Point.** Backbone State Park and State Forest; scenic area.
4. **Ames.** Iowa State College Department of Forestry, forest nursery, oak wilt research.
5. **Amana.** Amana colonies, collective farming and wood-using industries, white pine plantations growing 656 bd. ft. per acre per year.
6. **Tama.** Tama Indian Reservation, coniferous plantations.
7. **Des Moines.** Headquarters, Iowa Conservation Department. State Capitol.

Michigan

Lower Peninsula

1. **Lansing.** State Capitol. Headquarters, Michigan Department of Conservation and state forester.
   Rose Lake Wildlife Experiment Station.
2. **East Lansing.** Michigan State College Department of Forestry; forest nursery.
   Lake States Forest Experiment Station Lower Michigan Center.
3. **Ann Arbor.** University of Michigan School of Natural Resources.
4. **Decatur.** Russ Experimental Forest operated by Michigan State College.
5. **Allegan.** Allegan State Forest and Swan Creek Wildlife Experiment Station.
6. **Grand Rapids.** Furniture manufacturing center; numerous companies and displays.
   American Seating Company.
   American Excelsior Company.
7. **Muskegon.** Central Paper Company. Pulpwood yard; jack pine and mixed hardwoods; sulphite.
8. **Port Huron.** Port Huron Sulphite and Paper Company.
9. **Midland.** Dow Chemical Company, insecticides, fungicides, herbicides, preservatives. Plant tours available.
10. **East Tawas.** Headquarters, Huron National Forest Unit.
    Famous lumberman's monument.
11. **Roscommon.** Forest Fire Experiment Station.
    Regional Conservation Department headquarters; conservation training school.
    Forest nursery, early plantings; experimental forests.
    Pioneer Log Cabin Company.
12. **Grayling.** Hartwick Pines State Park, virgin pine stand.
13. **Cadillac.** Headquarters, Lower Michigan National Forest (Manistee and Huron units).
14. **Manistee.** American Box Board Company; pulpwood yard; semi-chemical pulp; aspen.

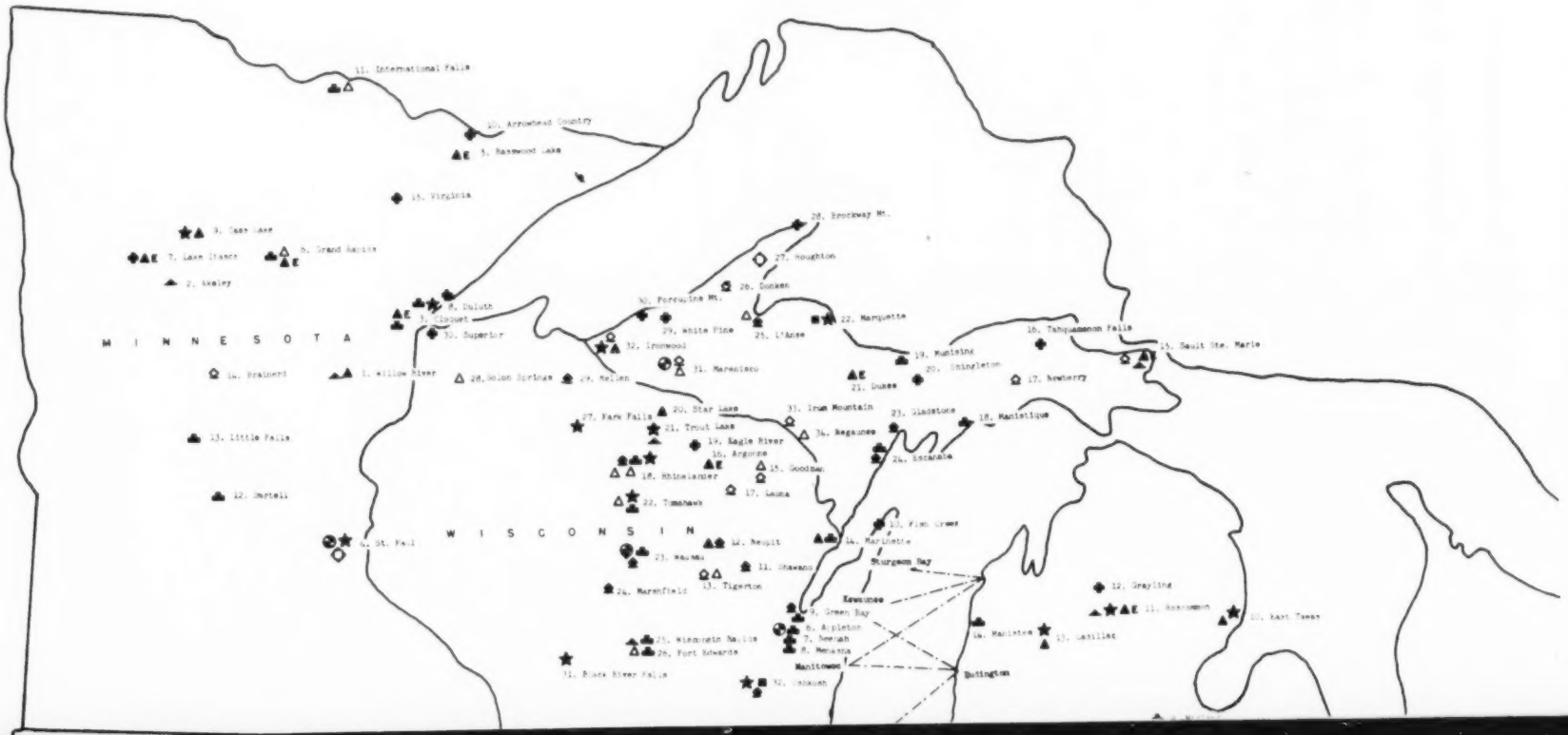
Upper Peninsula

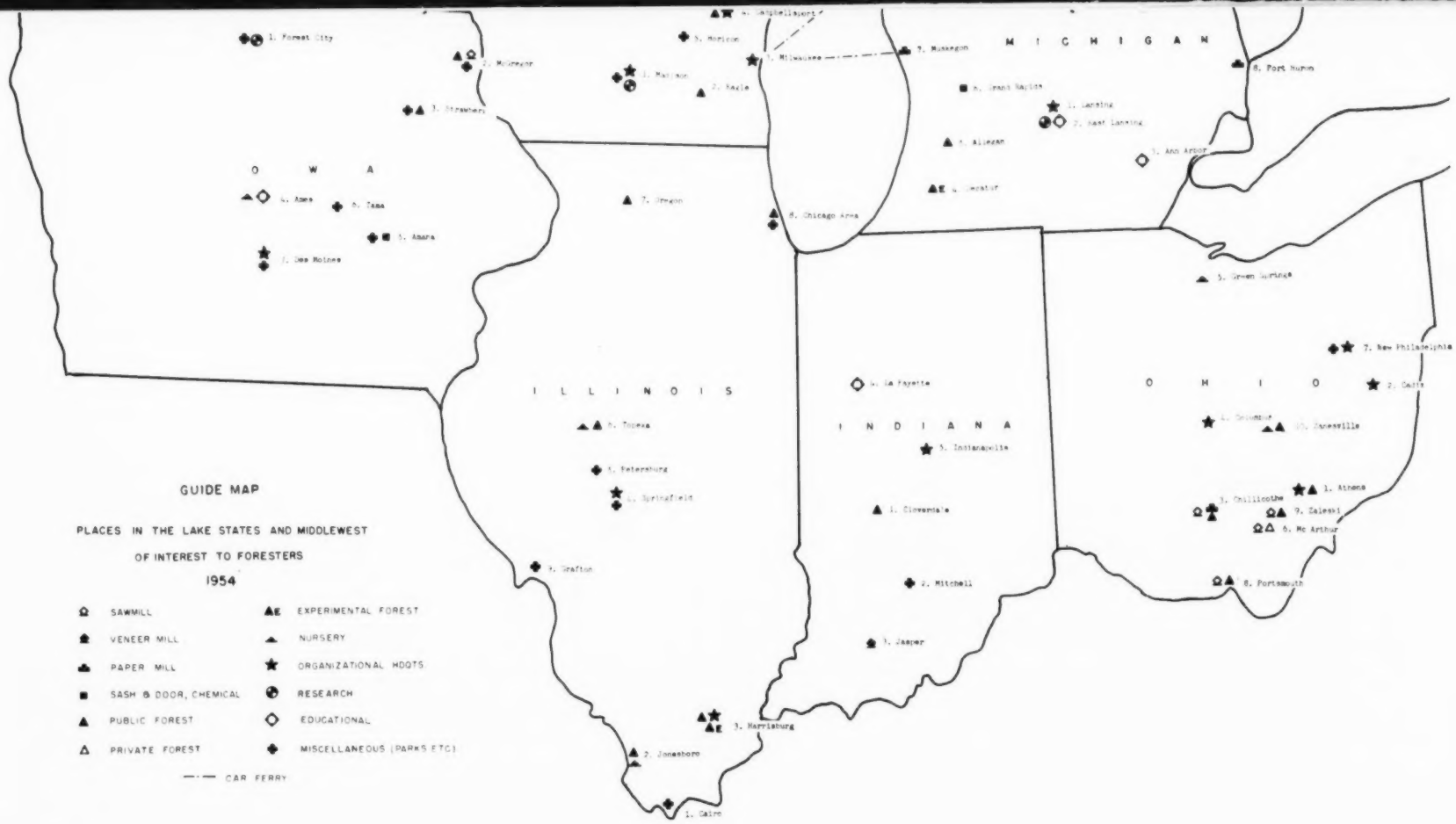
15. **Sault St. Marie.** Famous Soo Locks.
    Cadillac-Soo Lumber Company, band mill.
    Dunbar Forest Experiment Station, forest nursery.
    Michigan State College forestry summer camp.
16. **Tahquamenon Falls State Park.** Largest falls in the Mid-west.
17. **Newberry.** Barrett Logging Company sawmill.
18. **Manistique.** Manistique Pulp and Paper Company; spruce, balsam, and aspen; ground wood mill; pulp yard.
19. **Munising.** Munising Paper Company; spruce, balsam, aspen; sulphite mill; pulp yard.
    Munising Wood Products Company, wooden bowls and specialties.
    Atlas Plywood Company.
20. **Shingleton.** Wildlife Experiment Station.
21. **Dukes.** Lake States Forest Experiment Station, Upper Peninsula Branch Experimental Forests.
22. **Marquette.** Cliffs-Dow Chemical Company; charcoal, wood distillation.
    Regional office, Michigan Department of Conservation.
    Shipping docks.
23. **Gladstone.** Northwestern Veneer and Plywood; finish veneers; panel doors.
24. **Escanaba.** Escanaba Paper Company; spruce, balsam, aspen; groundwood; pulp yards.
    Birdseye Veneer Company; hardwood veneer and plywood.
    Headquarters, Upper Michigan National Forest.
25. **L'Anse.** Ford Motor Company industrial forest.
26. **Donken.** Vulcan Corporation band mill; kilns; shoe lasts, bowling pins.
27. **Houghton.** Michigan College of Mining and Technology Department of Forestry.
    Copper mines.

54th Annual Meeting

Society of American Foresters

Milwaukee, Wisconsin, October 24-27, 1954





A Guide Map to Locations in the Lake States and Surrounding Territory of Interest to Foresters

28. **Brockway Mountain Scenic Drive.**
29. **White Pine.** Much publicized modern mining operation and community.
30. **Porcupine Mountains State Park.** Beautiful Lake of Clouds.
31. **Marenisco.** William Bonifas Lumber Company; extensive land holdings, selective logging; insect and disease research and control.
32. **Ironwood.** Ahonen Lumber Company; band mill, doors, ties. Headquarters, Ottawa National Forest.
33. **Iron Mountain.** Abbot Fox Lumber Company; sawmill at Mass, Mich., managed timberlands.
    Kingsford Chemical Company.
34. **Negaunee.** Cleveland Cliffs Iron Company; ore lands managed for timber production.

Minnesota

1. **Willow River.** General C. C. Andrews State Forest and nursery.
2. **Akeley.** George Washington Memorial state nursery.
3. **Cloquet.** University of Minnesota Cloquet Experimental Forest, 3,700 acres. Northwest Paper Company. Diamond Match Company. Wood Conversion Company. Scene of historic forest fire.
4. **St. Paul.** University of Minnesota School of Forestry. Lake States Forest Experiment Station. Headquarters, Minnesota State Division of Forestry. State Capitol.
5. **Basswood Lake.** Quetico-Superior Wilderness Research Center.
6. **Grand Rapids.** 54-year-old Norway pine plantation. Blandin Paper Company. Headwaters Branch of Lake States Forest Experiment Station.
7. **Lake Itasca.** Itasca State Park, source of Mississippi River.
    University of Minnesota forestry and biological station.
8. **Duluth.** Start of scenic Lake Superior North Shore Drive. Headquarters, Superior National Forest. Superior Wood Products Company, ore docks. Halvorson Trees. Christmas tree producers.
9. **Cass Lake.** Headquarters, Chippewa National Forest.
10. **Arrowhead County.** Wilderness area, world-famous canoe country.
11. **International Falls.** Minnesota and Ontario Paper Company managed industrial forests.
12. **Sartell.** St. Regis Paper Company.
13. **Little Falls.** Hennipin Paper Company.
14. **Brainrd.** Park Region Timber Company.
15. **Virginia.** Mesabi Iron Range, world's largest open pit iron mines.

Ohio

1. **Athens.** District headquarters, Department Natural Resources, Athens State Forest.
2. **Cadiz.** Field office, Ohio Reclamation Service, reclamation coal strip mines.
3. **Chillicothe.** Tar Hollow State Forest Land Use Project, state sawmill. Mead Corporation, paper mill.
4. **Columbus.** Headquarters, Ohio Department of Natural Resources. State Capitol.
5. **Green Springs.** State Forest nursery, hardwood production.
6. **McArthur.** Baker Wood Preserving Company, preserving company and manufactures various wood products, managed industrial forest.
7. **New Philadelphia.** Headquarters, Muskingum Watershed Conservancy District.
8. **Portsmouth.** Shawnee State Forest, largest Ohio state forest, state operated sawmills, recreational areas.
9. **Zaleski.** Zaleski State Forest, land use project, state operated sawmill.
10. **Zanesville.** Blue Rock State Forest, state forest nursery, land use project.

Wisconsin

1. **Madison.** Forest Products Laboratory, U. S. Forest Service, world famous wood products research center. Wisconsin Conservation Department headquarters. State Capitol. University of Wisconsin, forestry research in genetics, soils, pathology, and entomology.
2. **Eagle.** Southern Unit Kettle Moraine State Forest, recreational forest development.
3. **Milwaukee.** U. S. Forest Service, Region 9 headquarters.
4. **Campbellsport.** Northern Unit Kettle Moraine State Forest headquarters, multiple use forestry, located east of Campellsport and north of Kewaskum.
5. **Horicon.** Horicon Wildlife Area, nationally famous wildlife habitat restoration project; controlled goose hunting experiment.
6. **Appleton.** Consolidated Water Power & Paper Company, sulphite mill.
    Institute of Paper Chemistry, industry-financed paper research institution, operated in cooperation with Lawrence College.
    Concentration of paper mills in nearby Kimberly, Kaukauna, Combined Locks.
7. **Neenah.** Kimberly Clark Corporation headquarters and mill. Forestry department headquarters, managing extensive forest lands throughout Michigan and Wisconsin; also mill at Niagara.
    Bergstrom Paper Company.
8. **Menasha.** Marathon Corporation, paper mill and converting plant, no pulp mill.
    Gilbert Paper Company. Wisconsin Tissue Mills. Menasha Woodenware Corporation.
9. **Green Bay.** Northern Paper Mills, groundwood and sulphite, extensively managed industrial forest located primarily in Upper Peninsula.
    Ft. Howard Paper Company, groundwood mill.
    Charmin Paper Company, sulphate and groundwood mill.
    Green Bay Pulp and Paper Company, semi-chemical mill.
    Nor Cor Veneer and Plywood Company, producing hardwood plywood.
10. **Fish Creek.** Peninsula State Park, outstanding scenic attraction on Green Bay, extensive recreational facilities.
11. **Shawano.** Jolin Corporation and Webber Veneer & Plywood Company, manufacturers of hardwood veneer and plywood.
    Concentration of hardwood veneer and plywood plants in surrounding towns including Gillette, Oconto Falls, New London, and Hatley.
    Shawano Paper Mills.
12. **Neopit.** Menominee Indian Forest and sawmill, nationally famous northern hardwood and hemlock forest under intensive management since 1908, 221,000 acres of forest, annual allowable cut 20,000,000 bd. ft., modern band mill. Centennial celebration of establishment of the reservation, August 7 and 8, and August 14 and 15.
13. **Tigerton.** Tigerton Lumber Company and industrial forest, band mill, development of forest management program involving company-owned and adjacent farm timberlands.
14. **Marinette.** Marinette County Forest. Outstanding managed county forest system.
    Marinette Paper Company, sulphite, pulp, and paper mill.
15. **Goodman.** Goodman Lumber Company and industrial forest. Integrated forest industry, modern sawmill, veneer plant and dimension plant, utilization of waste material as chips. Outstanding managed northern hardwood and hemlock forest.
16. **Argonne.** Argonne Experimental Forest, Lake States Forest Experiment Station.
17. **Laona.** Conner Lumber and Land Company, Wisconsin's largest sawmill, integrated forest industry, furniture plant, managed industrial forest.
18. **Rhinelander.** Headquarters, Nicolet National Forest.
    Wisconsin Conservation Department forest nursery.
    Rhinelander Paper Company, sulphite and semi-chemical, modern utilization of pulp wastes, managed industrial forests.
    Atlas Plywood Corporation, manufacturers of hardwood veneer and plywood.
    Consolidated Water Power & Paper Company, forestry headquarters.
    Wisconsin's largest managed industrial forest, management research,
    Northern Lakes Research Center of Lake States Forest Experiment Station.
19. **Eagle River.** Trees for Tomorrow camp, private industry-financed forestry educational camp. Field and classroom instruction to school and adult groups. Headquarters of Trees for Tomorrow, Inc., located at Merrill, Wis.
20. **Star Lake.** Star Lake plantation, outstanding 41-year old red pine plantation growing 1,000 bd. ft. per acre per year; experimental thinnings.
21. **Trout Lake.** Headquarters Northern Highland State Forest and state forest nursery.
22. **Tomahawk.** Wisconsin Conservation Department forest protection headquarters and shop.
    National Container Corporation, pulp and paper mill, sulphite and semi-chemical, large industrial forest development.
23. **Wausau.** Wausau Paper Mills, located at Brokaw, sulphite; development of system of continuous pulpwood supply from local forest landowners.
    Underwood Veneer Company, manufacturers hardwood veneer and plywood.
    Marathon Corporation, located at Rothschild; sulphite mill, carton plant; utilization of pulp waste materials in manufacture of by-products; outstanding research laboratories.
24. **Marshfield.** Roddis Plywood Corporation, Wisconsin's largest manufacturer of hardwood plywood, manufactures doors, paneling, and other veneer and plywood products.
25. **Wisconsin Rapids.** Consolidated Water Power and Paper Company, sulphite and ground wood; headquarters of extensive industrial forest development, 50th anniversary celebration in 1954.
    Wisconsin Conservation Department Griffith nursery.
26. **Port Edwards.** Nekoosa-Edwards Paper Company and industrial forest. Sulphite mill and company headquarters at Port Edwards; sulphate mill at nearby Nekoosa. Wisconsin's oldest industrial forest company owned nursery, intensively managed forests, management research, experimental chemical debarking of oak for pulp.
27. **Park Falls.** Headquarters, Chequamegon National Forest.
    Kansas City Star Company (Flambeau Paper Division), groundwood and sulphite mill, development of system of continuous pulpwood supply through working arrangements with local forest land owners.
28. **Solon Springs.** Mosinee Paper Company industrial forest, extensive coniferous plantations, early thinning of jack pine plantations for fence posts.
29. **Mellen.** Penokee Veneer and Plywood Company, manufactures hardwood veneer and plywood. Copper Falls State Park.
30. **Superior.** World's largest ore docks.
31. **Black River Falls.** Central Wisconsin conservation area, forestry and wildlife management development. Wisconsin Conservation Department area headquarters.
32. **Oshkosh.** Pluswood, Inc., manufacturers of hardwood veneer and plywood.
    Center of millwork industry, numerous companies.
    Headquarters, Northern Hemlock and Hardwood Manufacturers Association.

Notes

The Alliance of Forester and Woodpecker is Not New

At the Colorado Springs meeting of the S.A.F. in September 1953 a discussion of the assistance given to Colorado foresters by the woodpeckers in the campaign against the spruce bark beetle prompted this writer to search out a fifty-year old newspaper article previously encountered in research work. The comparison of the circumstances at these two points in the history of forestry may interest and amuse some foresters.

Near the turn of this century the Black Hills Forest Reserve of South Dakota was very new, and very much under the attack of the ponderosa pine bark beetles and of the local citizens. The administration of the forest even by "local citizen rangers" was not yet accepted and the thought of technical foresters coming from the East was much less acceptable locally. Under these circumstances the Bureau of Forestry appeared on the local scene to help halt the ravages of the bark beetles. The following article is one expression of the results of technical forestry during its early history in America. It appeared in the *Custer Weekly Chronicle* of Custer, South Dakota, on Saturday, June 28, 1902 under the pen name of Al Kali.[1]

The Bureau and the Bugs

The people of the various forest reserves have been slow to perceive the utility of the various specimens of young college men who have from time to time been turned loose singly or in small herds through the reserves of late years, and have at times indulged in criticism on the policy of sending eastern college graduates, with no experience of western life, to teach us how we ought to conduct ourselves in relation to the timber of the western forests; it is consequently with greater pleasure that we now admit that in at least one instance they have been pronounced a success.

But a short time ago the timber was being rapidly destroyed by a species of bug, and brown patches of dying trees were becoming numerous on the hill sides, ever spreading and breaking out in fresh localities till it appeared that the whole timbered area of the Hills was doomed to destruction. Then the Forestry Bureau came to the rescue and sent out a learned bugsharp or entomologist who gave the devastation bug a name of Latin appearance and many syllables that was too much for even a bug to carry about with him and thrive, and then followed up this attack with a shipment of eastern college graduates from the Bureau of Forestry, who had received a special training on the subject of bugs and their destruction, and who speedily came to the aid of the overworked woodpeckers, and other bug killing birds, who had proven unequal to the task of checking the rapid increase of the bug families.

The woodpeckers did nobly for awhile, but their object in destroying bugs was to provide food for themselves, and their utility as bug destroyers lasted only while their appetites were unsatisfied. Here is where the college graduate had the advantage over the woodpecker, he was killing for business instead of food, and rapidly demonstrated that one good man from the Bureau of Forestry was superior to a whole colony of woodpeckers.

We are now reaping the benefit of the foresight and energy of the Forestry Bureau, and the timber which at one time was threatened with destruction is rapidly becoming free from the pest which was destroying it.

Although sarcasm is certainly present in this article, an investigation of events that followed this "achievement" of the technical foresters indicates that this was the beginning of the long process of increasing local acceptance, understanding, and respect for forestry as a profession.

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[1]The present publisher of the *Custer Chronicle* wishes to make clear that the article reproduced here was contributed and does not necessarily reflect the opinion of the then, or the present, editor.

Forage Utilization

A lot of attention has been given to forage utilization methods which may be used in adjusting livestock numbers and their management to the capacity of the range under sustained yield objectives. Less attention has been directed to the development of sound concepts which are the foundation upon which methods may be built. First of all, the concept must be sound in terms of plant physiology, range conservation objectives, and mathematical reliability. Thus it is a worthy objective to direct renewed attention to the ultimate objectives in measurements of forage utilization.

The guiding principle in utilization methods is that forage plants have a certain tolerance to grazing, and that their productivity will not be sustained if they are repeatedly grazed past that tolerance limit. This must take into consideration variability among and within species, soils, climates, range conditions, and grazing seasons.

Two distinct concepts are involved in utilization methods which express cropping in terms of the percentage of herbage removed. One is based on volume-weight in which the results give the percentage by weight of herbage removed by the grazing animals; whereas, the other or alternate concept expresses in percentage the height of remaining herbage on a volume basis to the productivity of vigorous ungrazed plants.

With the first concept, weak ungrazed plants are properly rated at zero percentage utilization. Unless the vigor status of weak plants is known the utilization check could indicate that stocking should be increased. Similar difficulties may be introduced by variation due to years, seasons of grazing, species, soils, range conditions, climates, and intensities of grazing. It seems nearly impossible to evaluate all the factors which might confuse the meaning of such percentage values. In the field an examiner may feel considerable frustration when low percentage values are obtained, but do not provide the information needed in management planning. In that event there seems to be a tendency to influence the estimates by the height and quantity of remaining herbage. A single question then is paramount: Is the amount of residue herbage sufficient?

Furthermore, on many range areas there is stratification in both numerator and denominator herbage quotients involved in the per-

centage values. In general, herbage production may increase with increasing distance from water, but consumption tends to decrease with increasing distance from water. Actually the stratification isn't quite that simple, but this occurrence of stratification as simplified by description is enough to cause skepticism regarding the application of "percentage" mathematics.

Percentage removal data appear to have the value of permitting accurate computations of stocking rate changes needed to balance cropping with sustained forage supply. But the sources of variability prevent a direct plant physiological interpretation of those percentages, and relegate to near impossible the job of developing usable proper-use factors and the knowledge to justify their differentiation in application. Without accurate proper-use factors applicable to the individual situations introduced by the sources of variability, the quantitative concept in percentage utilization data may not be used with reliability for correcting stocking rates and systems of grazing.

Clearly the range manager is not so much interested in the amount or percentage of herbage removed as in the amount remaining. Furthermore, the amounts of herbage remaining need to be interpreted in the light of grazing influences as other factors fluctuate.

The alternative concept in which the residue herbage is rated on a percentage basis to the productivity of vigorous ungrazed plants accomplishes that objective in part. In this concept, weak ungrazed plants are recorded as highly utilized, and thus may be adapted to the objectives in maintaining satisfactory plant vigor. However, the percentage values have an abstract meaning completely unrelated to the percentage or quantity of herbage actually removed by the grazing animals. It would be more concise to fulfill this concept by recording those abstract values as decimals rather than percentages and refer to them as utilization quotients to distinguish them from percentage values which represent the weight actually grazed. Reciprocal quotients (representing ungrazed herbage) would help to emphasize what the plants have done rather than what the animals have done.

In this second concept, soil fertility, past grazing, weather conditions, and present grazing can be well represented in terms usable by the range manager. However, interpretation is in terms of individual plants irrespective of range condition, which must be evaluated separately. The same is true of other methods of evaluating ungrazed herbage; i.e., stubble height measurements and percentage of stems or plants ungrazed.

The writer proposes that samples of the amount of ungrazed herbage, expressed in weight per unit area by species, will represent plant condition, range condition, soil condition, weather, and grazing in a composite of effects that will be usable by the range manager. It is further suggested that the amounts of residue herbage at the close of the growing season (in the period of carbohydrate translocation) will be of most value where plant physiology is the most critical factor in management, but the amounts of herbage remaining in the fall when grazing is concluded will be of most value where soil stability and fertility is the most critical factor. Preliminary consideration has already been given to the development of proper-use factors.[1]

The writer suggests that the "percentage" concepts in forage utilization be discarded in favor of "residue" concepts. In this way knowledge of plant physiology, range ecology, range soils, and climatology may be united for direct application by range managers.

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Burns, Oreg.

[1]Hyder, D. N. 1953. Grazing capacity as related to range condition. Jour. Forestry 51(3):206.

[2]Squaw Butte-Harney Range and Livestock Experiment Station is jointly operated by the Bureau of Land Management, U. S. Department of the Interior, and Oregon Agricultural Experiment Station, Corvallis.

Tree Damage by Squirrels: Silviculturally Significant?

The great stabilized sand dunes along the eastern shore of Lake Michigan are clothed with a luxuriant growth of hardwoods, and a sprinkling of hemlock, and white pine. Beech, red oak, wild cherry, basswood, and white ash are the predominating hardwoods. Sugar maple is a minor component of the stand. From observations I feel its representation is presently limited by incessant squirrel damage. In Muskegon County's duneland nearly all sapling and pole sized sugar maples have been barked by squirrels. Most of the trees subsequently die. Even the tops of large mature maples are being attacked. Both grey and fox squirrels attack the trees and most of the damage is done in January and February. Species other than sugar maple aren't attacked. The squirrels do not seem to be starving and attack the maples regardless of other food supplies. Their teeth marks indicate they scrape the inner bark for sap or other nutrients. The chips of bark falling to the ground are not further chewed. Damage varies from winter to winter. It was heavy in the winter of 1950-51 and in 1953-54 winter was nearly as bad. Numerous summer homes and resorts located in the dune area greatly restrict squirrel hunting. Also the squirrel population is largely composed of black squirrels, a melanism of the grey squirrel (*Sciurus carolinensis leucotis*), which is protected by law. Possibly in earlier times squirrel populations were more rigidly controlled by many predators which are now comparatively scarce.

Such winter damage to sugar maples will no doubt continue unless some measures are taken to decrease the squirrel population. A continued high population means fewer and fewer sugar maples will be found in the dune forests of the future.

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Simple Aid to Instantaneous Measurement of Light Intensity

Many investigators have utilized some form of instrument embodying the photoelectric cell to measure instantaneous light intensity in forest stands. Numerous methods and modifications of these techniques have been employed in order to accurately measure incident light in forest investigations. Formerly, in silvical research, special emphasis was given to measuring the intensity or quantity of solar radiation; more recently the emphasis has included the measuring of light quality. Various approaches have been used for measuring light intensity, such as the heating effect of light employed by Shirley, (8) the illuminating effect of light determined by spectrophotometers, the instantaneous reading device modified by covering with a ground-glass sphere (1), the sensitized photographic paper photometer of Clements (5), and the radio-atmometer developed by Livingston (6). All of these methods represent further advances in the measurement of solar radiation from the viewpoint of increased accuracy inherent in the type or kind of instrument employed. For specific types of forest investigations, it is necessary to use a device which is not only accurate, but portable, cheap, and adaptable to forest conditions. To date, most investigations involved in determining light intensity have utilized some form of the well-known photoelectric exposure meter. These instruments are best adapted to instantaneous or spot measurement of light, and where extremely critical measurements are not paramount, they have proven satisfactory if properly used. The photoelectric cell does not single out the wave lengths responsible for photosynthesis, and assumes light intensity being measured as proportional to light quality. According to Burns (3), this is satisfactory for all practical purposes in the forest. However, W. G. Morris (7) has pointed out that with the Weston exposure meter, which utilizes a flat surface, "measurements to be comparable, must be made at the same angle of inclination." The use of an integrating sphere to enclose the photoelectric cell as shown by Bacon (1) eliminates the error encountered in measuring on a flat surface. Although the greatest need in silvical studies is a continuous recording exposure device for measuring the light during a specified period, most methods still lack standardization for general and practical determination of light intensity (2).

In many silvical research studies, the investigator is interested not so much in critical errors inherent in the device used as he is in supplemental data concerning light intensities. The majority of field studies have as their objective to compare relative light intensities for different sites and stand composition. This is not to infer that extreme accuracy does not have its place, but many practicing foresters lack the facility and time to investigate the comparative data obtained by use of several instruments. In many cases the forester does have at his disposal some kind of electric photometer with which he can obtain quite satisfactory results.

The combined photoelectric cell and holding device presented here is an attempt to point out that satisfactory, practical results can be obtained by using some form of exposure meter, if the procedure employed in its use is properly executed. The method described is a modification of that originally developed by R. F. Chandler, Jr. (4). Two essential criteria upon which the measurement is based are:

1. Reflected light intensity is measured rather than light falling directly upon the photometer from above.

2. The intensity of light measured in the forest stand is based upon the amount of reflected full sunlight in the open, and expressed as a percentage of full open sunlight.

Since the photoelectric cell is quite satisfactory for use in the field, a method was devised to measure light intensity by combining the electric photometer with a support for field use. This combination brings together the photoelectric cell and its application to a silvical research study.

Construction of Apparatus

1. The exposure meter is placed in a holding device and mounted directly above a white bond pa-

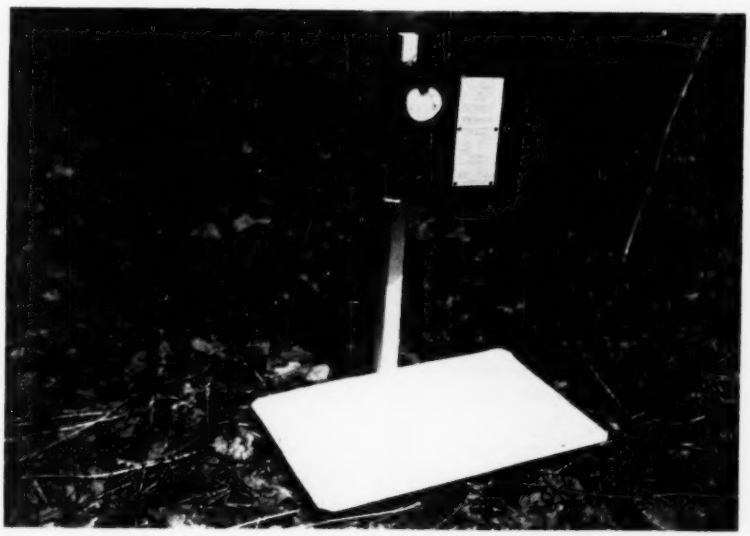

FIG. 1—Combined photoelectric cell and holding device. An ordinary canned meat container and rubber band are used for additional support. A fixed focal distance of 12 inches is maintained between reflecting surface and cell.

per reflecting surface. The reflecting surface dimension is 17x22 inches and lies parallel to the ground surface, exactly 12 inches vertically from the photoelectric cell (Fig. 1). The holding device consists simply of the bottom half of an ordinary canned-meat container which is tacked to a wooden upright screwed to the wooden base. The white paper is attached to this base by thumb tacks which facilitates easy replacement of the paper.

2. Top side of the photometer is held rigidly to the upright by a rubber band, and the entire apparatus is painted white, with the exception of the paper. A Weston Foot Candle Meter Model 614 can be used satisfactorily with this type of simplified holding apparatus and reflecting surface.

Application of the Method

A sufficient number of individual readings per unit of sampling area should be taken. These measurements can be made at a specified distance apart in accordance with the size, objective, and accuracy desired. Departures from the sampling procedure can be made to fit variations in the unit area measured. An accurate description of the sampling area as to topography, time of day, climatic conditions, and sampling procedure should be made so that observations may be duplicated if need be at a later date. A compass to note direction and stakes to mark location of the sampling plot are valuable aids for tying in the sample measurements.

The following sampling method was carried out, using the apparatus described, in order to gain a knowledge of the relative light intensity in an upland hardwood forest: A five percent sampling of 165 one-tenth acre plots was made, or a total of 8 separate plots. Individual spot measurements were taken every fifteen feet, or twenty-five measurements on a square 60-foot plot. Open field measurements were recorded eleven times and these served as the average percentage basis for measurements taken inside the woods proper.

Light measurements were taken only upon cloudless days with a minimum of wind and were expressed as percentages of open-sunlight measurements. It is essential to take the reading free of any factor that may materially influence the light intensity such as wind movement, twigs falling across the measuring device, clouds, and leaf fall. As each spot measurement was taken, the device was pointed in the direction of incident source of solar radiation. Since the light reading dial was then in a position opposite to the observer, a small hand mirror was utilized to read the dial directly, without interfering with light rays falling upon the reflecting surface. At each recording station, the reflecting surface was held parallel to the ground surface. By simply swinging the circular cell back into the case and picking up the entire apparatus, the observer can move on to the next station. The entire measurement for all plots was taken between a specified period, 10:30 A.M. and 1:30 P.M. for any one day. At every half hour interval, readings were tallied in the open so as to arrive at a substantial open-field average. From these readings, data can be expressed directly in average foot candles per station, per plot, and per square foot of sampling area, all based upon percent of full sunlight intensity.

Advantages of Apparatus

1. A portable, light, inexpensive holding device can be constructed to meet the demands of most light measuring studies. The device can be modified to fit the standard types of exposure meters.

2. Measurements can be taken rapidly and duplicated by position at a later date if necessary.

3. Human error in holding the photometer is eliminated since a fixed focal distance parallel to ground level is obtained. The exposure meter is easily removed from the holding device when not in use.

4. A measure of reflected light intensity is obtained, rather than direct solar radiation. This is equivalent to the measurement of light intensity reaching the herbaceous vegetation of the forest floor. Standardization of reflected readings permits duplication of the method for similar studies.

5. The apparatus is adaptable for small acreages such as farm woodlots and artificial plantations.

Disadvantages of Apparatus

1. It is often difficult to obtain a convenient opening in which to measure full open sunlight in large acreages, except where blowdowns have occurred. This disadvantage could be overcome by using a second device which could be read at the same time as the measurements being taken in the woods proper.

2. The apparatus measures light intensities reaching the forest floor. Often it is desirable to obtain intensities nearer the crowns of forest trees. In extremely rough terrain, the apparatus may have to be modified.

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Coming Events

American Forestry Association

The annual meeting of the American Forestry Association will be held at the Multnomah Hotel, Portland, Ore., September 6-9.

Southwestern Section

The fall meeting of the Southwestern Section will be held at Taos, New Mexico, October 8-9.

Society of American Foresters

Annual meeting, Hotel Schroeder, Milwaukee 3, Wis., October 24-27.

National Watershed Congress

Statler Hotel, Washington, D. C., December 6-7.

Western Forestry and Conservation Association

The 45th Western Forestry Conference and the annual meeting of the Western Forestry and Conservation Association will be held at the Fairmont Hotel in San Francisco, December 7-10.

Fourth World Forestry Congress

Sponsored by United Nations Food and Agriculture Organization, New Delhi, India, December 4-17.

Indian Botanical Society Symposium on the Vegetation Types of India

A symposium on "The Vegetation Types of India" will be held by the Indian Botanical Society on December 31, 1954, and the following days at Baroda. Workers in the field are requested to send their manuscripts together with brief abstracts so as to reach the undersigned before September 1, 1954. The contributed papers and the proceedings of the symposium will be published at an early date. It is expected to cover the following types of vegetation of the different regions of the country: forests, grasslands, aquatic vegetation, mangrove, desert vegetation, vegetation of other habitats such as sand dunes, silted banks, eroded and barren areas, etc., etc. The ecological accounts will be given under the following headings: climate, geology and soils, biotic features, floristic composition, succession, climaxes, etc.

R. Misra

CONVENER, STEERING COMMITTEE,
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Points of View

Is an "American Society for Forest Genetics" Needed?

In the Points of View section of the May issue of the JOURNAL, Frank Woods[1] urges the establishment of an "American Society for Forest Genetics."

A number of us working on tree improvement in the South feel there is little present need for such a society. The application of genetic principles in forestry will be through silviculture. The silviculturists and foresters in general have been most willing to let the geneticists make known their viewpoints. Many meetings of the S.A.F. have included papers on tree improvement, as witness the Annual Meeting last year. The Silviculture Division of the S.A.F. has recognized a Committee on Forest Tree Improvement. An Associate Editor of the JOURNAL OF FORESTRY for Forest Genetics and Artificial Regeneration has been appointed. The JOURNAL frequently carries genetics articles and is to have a special issue on genetics. All the cases listed above illustrate the acceptance forest genetics has received.

Many of us feel that the best way to show the true value of applied forest genetics is to emphasize its place among other tools of silviculture. Its function is to point up the inheritable similarities and differences among trees with which the forester works, and to indicate how these similarities and differences can be used in forestry practice. A new society would tend to draw apart instead of drawing together those who can most benefit by the use of genetic principles. The forest geneticists would be saying in effect "We're different. We're something unique in this field of forestry." That feeling is too prevalent now among various specialists in the field of forestry. Workers in any phase of forestry can say that but the profession would suffer seriously if it broke up into a large number of fragments, each of which felt it was different from and perhaps a little superior to the others.

There are only a few men actively engaged in forest genetics research at the present time. The liaison among them is excellent. There are numerous opportunities for interchange of information. In the South, for example, the Committee on Southern Forest Tree Improvement, consisting of representatives from industry, schools, and State and Federal Governments, holds regular semiannual meetings. Every two years this Committee sponsors an open regionwide meeting—in effect a symposium—at which time any interested person can attend the sessions, meet fellow workers and visitors from other regions, and take part in the discussions. Other regions in the United States have similar committees. The Committee on Forest Tree Improvement in the Division of Silviculture is active on a national scale. The Forest Genetics Research Foundation has indicated interest in sponsoring nationwide technical meetings for interested persons.

To sum up, although there can be no doubt on the importance and necessity of the points Woods lists, most of them are adequately handled under our present organization.

Personally, I challenge Woods' statements and implication that forest genetics is rather impractical and lacks proven financial benefits. As one example, what could be more practical—and economically significant—than the use of the proper geographic strains in our planting program? Many times, here and in Europe, use of the wrong strain has resulted in a reduction of yield, quality, or both, or in complete failure. It must be granted that the true worth of many improved strains and hybrids now under test has not been proven, but the better silvicultural practices applied with a genetic viewpoint have already been of great value.

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[1] Woods, Frank. We need an American society for forest genetics. JOUR. FORESTRY: 52 (5) 361. 1954.

Look Out for Flying Splinters

This writer has no wish to advise forest geneticists on the conduct of their affairs but as a worker in a related field he stands ready to nominate the proposed American Society for Forest Genetics[1] to his master list of "Societies We can Easily do Without." This is due to no lack of sympathy for forest genetics; the writer has been a consistent supporter of its value and expects to continue thus

long after the paint on the present genetics bandwagon has become timeworn and dingy. But it seems to him that Mr. Woods' enthusiastic plea for a separate society can be considered in a different perspective and with a very different conclusion.

The group in agriculture most comparable to "forest geneticists" usually go under the less elegant title of "plant breeders". At a guess the number of such workers at the Ph.D. level is 10 to 30-fold greater than that of all forest geneticists now existing or in the assembly lines. Their work has been in progress for several decades. Its scientific achievements, both in building from and contributing to the fundamental aspects are well established; its practical aspects, of course, are appreciated and supported by almost every farmer, florist and orchardist. Some, indeed, such as hybrid corn, have come to symbolize the whole progress of agricultural science.

One might inquire what "general unifying organization", with what "requirements, functions and ideals", was needed for such achievement? None at all: The plant breeders are divided in professional allegiance between the American Society of Agronomy and the American Society for Horticultural Science, chiefly according to their crop interests, and they are minorities in both societies. Those more deeply concerned with the scientific aspects are members also of the Genetics Society of America. Far from suffering under such an arrangement the plant breeders profess to have benefited by the close association with agronomists, soil scientists, agricultural engineers and others shaping the fast changing agricultural technology, and the equally close association with the evolving science of genetics.

One looks in vain also for separate societies of forest pathologists, forest entomologists and forest soil scientists. Instead, each of these groups seems to find difficulty in believing that its scientific principles actually differ from those of the parent sciences, or that its practical aims can be dissociated from those of forestry. One may reasonably ask how the infant branch of forest genetics, prodigy though it may be, is to attain its rightful stature without similar associations. How, without the twin disciplines of enlightened practicality and scientific rigor, can it escape narcissism, the manifestations of which are not now entirely absent?

At very least, the experience of these other groups indicates that forest genetics does not require a separate society for its successful development. Moreover, the structure of the SAF permits, if it does not encourage, divisional status for subject matter groups of sufficient size and permanence. This alternative also avoids many of the hazards that beset a small independent society. The interest of the SAF is illustrated by appointment of an associate editor for genetics to the JOURNAL, and by issuance of a special genetics number.

One wishes that the various separatist movements would consider the damage to both parent and splinter societies from the process of fragmentation. For his part, the professionally minded forester might well ask whether such fragmentation of the present Society of American Foresters is to be a continuing or desirable outcome of increasing growth and specialization. Must each new concentration of interest splinter off, leaving the central core of forestry intact but increasingly circumscribed and to some extent impoverished? One notes with interest that the success, as well as the phenomenal growth of the American Chemical Society (over 70,000 members; 7 journals) is associated with a liberal though restrictive membership policy, acceptance of professional specialization as inevitable, opportunity for unhampered formation of autonomous divisions, and an attitude of professional tolerance.

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Reviews

The Use of Wood Chips in Agriculture

Northeastern Wood Utilization Council, New Haven 6, Conn. 96 pp. 1954. $2.

Use of wood chips to do a better job of farming has received increasing attention during the past five years. The Northeastern Wood Utilization Council under the leadership of its past secretary, Edgar L. Heermance, has played an important role in directing the attention of foresters and agriculturists to the probable increased use of wood fragments by farmers.

To publicize and stimulate interest in the use of wood chips the Council arranged three conferences, issued four bulletins, and has issued many news items in its periodic reports to members.

This bulletin (number 41) is the gleanings from the latest conference, held at Syracuse, N. Y. October 9, 1953 when the subject "The Use of Wood Chips in Agriculture" was discussed by over fifty foresters, agriculturists, and others.

It contains reports on the several economic and conservation questions that must be resolved before there can be general farmer acceptance of the worthwhileness of using wood chips to do a better job of farming.

The paper on "Wood Chipping as a Farm Woodland Enterprise" is an excellent analysis of the forester's viewpoint. There are several papers on methods and costs of getting out polewood and operating a wood chipper. Results from the use of wood fragments as a mulch or soil conditioner are reported by several persons whose studies were conducted at agricultural experiment stations. Of particular interest to foresters is a report on the beneficial use of wood chips in the management of soil and seedlings at a forest tree nursery.

The appended selected bibliography of about fifty references, arranged under eleven subject matter headings, will be of value to those who seek further information.

It is predicted that this bulletin, as has been the case of its predecessor *Chipped Wood Production and its Uses*, will be in such demand that there will be reprintings.

A. C. McIntyre

Forest Products Research and Industries in the United States

By W. W. Varossieau. 796 pp. Illus. J. M. Meulenhoff & Co., N. Y., Amsterdam, The Netherlands. 1954. Hfl. 45.

In 1949 the author was commissioned by the Technical Assistance Branch of the European Recovery Program to visit the United States and study American methods for the production, harvesting, processing, and conversion of timber, and to determine to what extent these methods might be used in aiding the recovery of the European forest industries. This book is actually a report of the author's travels, contacts, observations, and a perusal of a considerable volume of the literature dealing with American forest products and forest products technology and research.

Part I, includes a statement of the objectives of the author's visit, and outlines his itinerary and personnel contacted while in the United States.

Part II "Forestry Contacts," is a discourse of the forest resources of the United States. Comparisons are drawn between our raw material supply with those of other forested areas throughout the world. Included in this section also is a review of damage and losses in forest stands traceable to fire and biological agents.

"Contacts with Forest Products and Allied Industries" is the heading of Part III. Here the author discusses (1) sawmills, (2) timberyard practices, and the (3) wood preserving, (4) plywood and allied products, and the (5) derived and by-product industries. Numerous tables of statistics, graphs and line cuts, and excellent subject matter bibliographies enhance the value of this portion of the book.

Part IV includes the author's summary and conclusions, while Part V comprises a series of indices.

This book represents a prodigious amount of meticulous effort. The subject matter is well organized, and the printed text, except for a few typographical errors, has been well edited. Excellent halftone illustrations, many of them originals by the author, add to the attractiveness of the volume.

In his conclusions the author states, "As a rule it is not advisable to introduce into Europe processes and practices which are commonly applied in the United States, and which are described in this report, without a thorough investigation of their effectiveness under different circumstances which prevail in the 'old world.' These differences originate from the fact that labor is very expensive in the United States. Therefore, it pays to mechanize processes which save manual operation. In Europe, however, materials are comparatively expensive in comparison with labor, and for this reason the mechanization may not be justified."

The author would have been compelled to modify this statement had he spent some of his time in study in the southeastern United States, and it is difficult to comprehend why those responsible for planning his itinerary completely bypassed the South. Surely, the forests of the South exhibit much greater similarity to European forests than do those of the West Coast. Southern forests like those in Europe are largely second growth in character, and industry has been geared to the use of smaller, and often more defective, logs these forests produce.

These comments are not intended as a criticism. The book itself is excellent, and will serve as an

authentic and useful reference volume. But in the South, rather than on the West Coast, the author might have been able to find a number of processes, practices, and production methods that conceivably could be more readily adopted to a European economy than those upon which he made his report.

E. S. HARRAR

Animal Control in Field, Farm and Forest

By W. Robert Eadie. 257 pp. Macmillan Company, New York 11, N. Y. 1954. $3.75.

In recent literature the economic aspects of wildlife, particularly those dealing with the management and control of animals detrimental to man's best interests, usually have been treated piecemeal in pamphlets and short references relating to specific problems or animals. Hence, Dr. Eadie's new book, which brings together for the first time the many and often obscure writings on mammal control, should be a useful text, not only to professionals and students in the field of natural resource management, but also to sanitarians, farmers, home owners, and others who may be faced with losses caused by animals.

Forty groups of animals are discussed by the author. His sense of organization and economy of phrascology have enabled him to compress a great amount of information within the book's 257 pages. Animals are grouped in relation to their economic significance; thus a given section may include an entire order (bats, for example) while another may include but a single genus such as house rats, or coyotes. For each group there are paragraphs on identification and habits; economic status; control; and natural enemies; followed by representative reference lists. A list of general references is appended. The book is well indexed, attractively printed, and of handy size.

A commendable amount of attention is given to animal habits, relationships to man's activities, and ecology. Control by natural enemies and by management measures other than killing is also covered impartially. Directions for control by trapping, hunting, poisoning, or other reductional methods are concise, explicit, and reasonably inclusive considering the mass of scattered references which had to be consulted. Even so, it is surprising that there is, for example, no mention of the standard methods of controlling bears with traps and with dogs.

Several other apparent omissions are doubtless traceable to the fact that any book on a rapidly developing science or art, such as mammal control, must inevitably be somewhat out of date before it appears on the bookstands. Thus, *Animal Control* makes no mention of recent developments in rat repellents on which initial published reports appeared in 1950. Similarly, there is no mention of recent use of aircraft in distribution of poison baits to control cotton rats in cane fields. Foresters will wish there could have been more complete and up-to-date information on rodent control in relation to reforestation. Modern mouse control methods, which now make it practicable in the Douglas-fir region to do direct seeding from aircraft, are not mentioned although experiments were underway in 1945 and aircraft distribution of mouse bait had been developed and reported upon in 1951 and 1952.

These criticisms are of little account in relation to the general usefulness of this book. Dr. Eadie's text is truly a monument to his perseverance in gathering information and his impartiality in presenting a difficult and controversial subject. It should meet a long-felt need in classrooms and on the reference shelves of those who are concerned with wildlife management and conservation.

CLIFFORD C. PRESNALL

Olympic National Park: Washington

By Gunnar O. Fagerlund. 67 pp. Illus. Supt. of Documents, Washington 25, D. C. 1954. 30 cents.

As stated on the inside cover of this paper bound booklet, this is "Natural History Booklet Number One . . . one of a series of handbooks explaining the natural history of scenic and scientific areas of the National Park System administered by the National Park Service."

This booklet is one answer to the dissemination of correct information, presented in an interesting and readable manner, concerning the many interests embodied in the national parks and monuments. Presumably, additional booklets of a smiliar nature will follow, concerning other areas. Such a program is certainly fitting in the development of general public understanding of the highly significant features of these "outdoor museums."

Profusely illustrated with photographs, sketches, and maps, this booklet outlines the salient features of interest of the justly famous Olympic National Park. Various sections are devoted to an explanation of the geology of the area, its forests and plants, its animal life, its history and Indians. A small section points up the interests embodied in the section of the park which borders the Pacific Ocean—the "ocean strip." Another outlines the steps that were taken in the establishment of the park. A third indicates the varied means of access to the area. All in all, its pages contain a great variety of information that will be highly valuable—both to park visitors and to those who are interested in this aspect of conservation.

C. FRANK BROCKMAN

HARDWOOD INSERTS, placed between the crosstie and steel plate supporting the rail, are proving to be another successful means of extending the service life of crossties, according to Timber Engineering Company, research affiliate of the National Lumber Manufacturers Association. The inserts are one of several crosstie research projects conducted at Timber Engineering's laboratory under the joint sponsorship of the nation's railroads and the lumber industry.

The Friendly Evergreens

By L. L. Kumlien. 237 pp. Illus. Rinehart and Co., New York. 1954. $10.

When originally published in 1936 by D. Hill Nursery Company, Dundee, Ill., as *Hill's Book of Evergreens*, the JOURNAL OF FORESTRY welcomed the volume with friendly praise and good wishes. A new edition, issued in 1946, was likewise reviewed in the JOURNAL as a practical and informative guide for the nurseryman, the landscape engineer, the forester, and the home owner. The present offering is a worthy successor to its predecessors.

Probably few products of plant life in the temperate zone have had as profound an influence on man's aesthetic and economic life as the evergreen trees. It is with the evergreens as objects of beauty that this book is principally concerned. The prospective buyer should be warned that it is neither an encyclopedia nor a technical treatise on tree propagation. It is, in short, a well written, attractively printed beautifully illustrated series of chapters on how to recognize, how to grow, and how to enjoy the conifers and related genera.

A practical and successful nurseryman, Mr. Kumlien has learned much about trees that is not to be found in textbooks on botany or horticulture. His book thus stresses the pragmatic rather than the theoretical side of tree culture. Consequently, though brief, his chapters on fertilizing, pruning, and pest control—to mention but three—are down to earth and full of recommendations based on his own experience fortified by tried and proven research findings.

Likewise his chapters on evergreens in landscape design, on foundation planting, on windbreaks and hedges, and on Christmas trees are simply written and completely understandable. One wishes his chapter "The Nursery Industry" were longer because it is a fascinating if relatively small business, and foresters generally would be interested to know more about it, especially the ornamental nursery industry.

There are hundreds of clearly reproduced illustrations, many in color. All things considered, *The Friendly Evergreen* is this reviewer's personal nomination for the most beautiful and useful book on trees of the year.

HENRY CLEPPER

Publications of Interest

Texas National Forest Study is a 60-page bulletin constituting the report of S. L. Frost to the East Texas Chamber of Commerce upon completion by him, as a consulting forester, of a four months' study of national forest ownership in that area. The bulletin is published by the East Texas Chamber of Commerce, Longview.

It is, in the words of the author, "a study of the Texas National Forests, and of their administration; and of their relationship to private forests, the forest industries and the communities they lie near."

Briefly, the report recommends that these national forest lands be sold back into private ownership in units judged to promote the best economy; the land to be appraised and sold to the highest bidder, with each deed carrying a covenant to assure continued good management and retaining hunting and fishing rights for the public. It recommends that public recreation areas be continued as such and administered by either the counties or the State Parks Board. Alternative suggestions are included, covering ultimate transfer of ownership of the forests to the counties, the State, or retention as federal lands.

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Planning Farm Fences and *Building Farm Fences* are two bulletins prepared by G. E. Henderson coordinator of the Southern Association of Agricultural Engineering and Vocational Agriculture. In them he has pulled together a wealth of information on fence planning and construction hitherto available only in scattered sources. Illustrations by C. E. Turner add materially to the pamphlets' value.

Laying out and building fences has been largely a matter of experience—practices handed down from father to son and trial and error has played a major role in the techniques used today. But in the past ten years research has developed much new information. Some of it bears out old methods; some points to better ways of doing the job.

These two attractive publications, printed in two colors, are designed for use as teaching units in vocational agriculture classes. They cover fence planning, effectiveness of various types of fences, how to select quality materials, life expectancy of different kinds of posts, types of anchor and brace assemblies that will stand the strain, and step-by-step procedures for building woven-wire, barbed-wire, and board fences. Movable fences and passageways are also covered.

Obtainable at 50 cents each from the Coordinator's Office, Agricultural Engineering Department, University of Georgia, Athens, Georgia.

R. L. SCHNELL

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The *1954 Pulpwood Annual*, edited by the American Pulpwood Association, is ready for distribution. This 64-page publication contains sections on (1) Mechanization of the Pulpwood Industry, including accident cost reduction and the Canadian viewpoint on mechanization; (2) Management of Company Forest Lands, including forest loans and pulpwood rotations; and (3) Needs for Basic and Applied Research, including utilization problems of hardwoods and mill wastes. It also contains discussions on woods training, safety, and supervision; wood preparation; hauling and handling; industrial forestry; and improvement opportunities. Men from the industry—north, south, east, and west—participated in making this material available for the Annual.

Copies of the 1954 *Pulpwood Annual* may be obtained by writing to PULPWOOD ANNUAL, 370 Lexington Ave., New York 17, N. Y. $1.00 per copy.

Current Literature

Compiled by MARTHA MEELIG, *Librarian, State University of New York College of Forestry*

Range Management Section Compiled by FRANCES FLICK, *Library, U. S. Department of Agriculture*

General

Africa; A Study in Tropical Development. By L. D. Stamp. Chapter 6 Forest, Grassland and Desert. 568 pp. Illus. Wiley & Sons, New York. 1953. $8.50.

Forestry Abstracts Coverage List; Periodicals and Series. 180 pp. Food and Agric. Org., Rome, Italy. 1953. FAO Forestry & For. Products Studies No. 7. $1.50 (Columbia Univ. Pr.)

Forestry Opportunities in the Republic of Liberia. By Torkel Holsoe. 41 pp. Illus. Foreign Operations Administration, U. S. Dept. of Agric., Washington, D. C. 1954.

Forstökologie. By F. Hartman. 461 pp. Fromme & Co., Vienna. 1952. 52 DM.

Laws of Montana Relating to Forestry. Comp. by Rutledge Parker. 120 pp. Office of the State Forester, Missoula. 1954.

Manual of Indian Forest Botany. By N. L. Bor. 441 pp. Illus. Oxford Univ. Pr., Indian Br., Dehra Dun. 1953. Rs 25 or 42s.

National Forest Facts Southwestern Region. 37 pp. U. S. Forest Serv., Albuquerque, New Mexico. 1954. Mimeog.

The Story of the Kauri. By A. H. Reed. 429 pp. Illus. A. H. & A. W. Reed, Wellington, New Zealand. 1953. 47s 6d.

Conservation

Upper Saugeen Valley Conservation Report 1953 Summary. 170 pp. Illus. Ontario Dept. of Planning & Devel., Toronto. 1953.

Forest Influences

Cascade Head Climatological Data 1936-1952. 29 pp. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1954. Mimeog.

Forest Resources

Forest Inventory Statistics for Jackson County, Alabama. 12 pp. Tennessee Valley Authority, Norris, Tenn. 1953. For. Bul. No. 30. Mimeog.

The Forest Resource of Lake of the Woods County. 61 pp. Illus. Office of Iron Range Resources and Rehabilitation, St. Paul 1, Minn. 1953.

Forest Statistics for Clatsop County, Oregon. By F. L. Moravets. 24 pp. Pacific Northwest Forest and Range Expt. Sta., Portland, Ore. 1954. Forest Survey Rept. No. 113. Mimeog.

Forest Statistics for Crook County, Oregon. By F. L. Moravets. 22 pp. Same, 1954. Forest Survey Rept. No. 114. Mimeog.

Logging and Milling

Lumber Grade Yields in the Loblolly-Shortleaf Pine Type by the Southern Pine Log Grades. By T. A. McClay. 12 pp. Southeastern Forest Expt. Sta., Asheville, N. C. 1954. Station Paper No. 37. Mimeog.

Motorsagkedjor, deras arbetssätt och konstruktion (The Power Saw Chain its Function and Construction). By Ivan Troëng. 41 pp. Illus. Sweden. Statens Skogsforskningsinstitut, Stockholm. 1953. Med. Bd. 41 nr. 8. 2: —kr.

Overrun from Yellowpoplar Sawlogs; Some Factors Affecting Overrun at Circular Mills. By P. H. Lane. 14 pp. Tennessee Valley Authority, Norris, Tenn. 1954. Tech. Note. No. 21. Mimeog.

Pathology

Defects in Hardwood Veneer Logs: Their Frequency and Importance. By E. S. Harrar. 45 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1954. Station Paper No. 39. Mimeog.

Northern Hardwood Cull Manual. By S. B. Silverborg. 40 pp. Illus. State Univ. of New York College of Forestry, Syracuse 10. 1954. Bul. No. 31. 75 cents.

Protection

Fire-Flood Sequences on the San Dimas Experimental Forest. 29 pp. Illus. California Forest and Range Expt. Sta., Berkeley. 1954. Tech. Paper No. 6. Mimeog.

Forest Fire Losses in Canada 1952. 17 pp. Tables, charts. Canada Forestry Branch, Ottawa. 1953.

Some Thoughts on Forest Fire Damage Appraisal. By J. A. Mitchell. 4 pp. Lake States Forest Expt. Sta., St. Paul 1. 1954. Misc. Rept. No. 29. Mimeog.

Range Management

The Grasslands of the United States. By M. W. Taylor. British Grasslands Soc., Belfast, Ireland. Jour. Vol. 8, pp. 321-336. December 1953.

Handbook of Plants of the Colorado Front Range. By W. A. Weber. 232 pp. Univ. of Colorado Press, Boulder. 1953. $5.00.

Range Management Versus Drouth. 8 pp. Illus. Texas Agric. & Mechan. Col., Extension Serv., College Station. Cir. No. C-320. Feb. 1953.

Silviculture

Controlling Woody Plants with 2, 4, 5-T; 2, 4-D and Ammate. By S. C. Martin, J. M. Nichols, D. L. Klingman. 8 pp. Illus. Univ. of Missouri Agric. Expt. Sta., Columbia. 1954. Bul. No. 615.

Direct Seeding of Oak in Missouri. By J. M. Nichols. 4 pp. Univ. of Missouri Agric. Expt. Sta., Columbia. 1954. Bul. No. 609.

Killing Undesirable Woody Plants With Chemicals. By L. S. Hamilton and R. R. Morrow. 5 pp. Ext. Serv., Forestry. State Univ. of New York College of Agriculture, Ithaca. 1954. Dept. Conserv. Mimeog, Leaflet No. 9.

The Modified Cyclone Seeder as an Aid in Obtaining Uniform Seed Dissemination in Direct Seeding. By J. F. Gartz. 2 pp. Illus. Oregon State Board of Forestry, Salem. 1954. Research Note No. 14. Mimeog.

Shortleaf Pine. By W. R. Mattoon. 43 pp. Illus. U. S. Dept. of Agric., Washington 25, D. C. 1954. Farmers' Bul. No. 1671. 20 cents.

Site Preparation as Related to Ground Cover Density in Natural Regeneration of Ponderosa Pine. By D. Tackle and D. F. Roy. 13 pp. Illus. California Forest and Range Expt. Sta., Berkeley. 1953. Tech. Paper No. 4. Mimeog.

Slash Pine (Pinus Elliottii), Including South Florida Slash Pine, Nomenclature and Description. By E. L. Little, Jr. and K. W. Dorman. 82 pp. Illus. Southeastern Forest Expt. Sta., Asheville, N. C. 1954. Station Paper No. 36. Mimeog.

Thinning Problems and Practices in Denmark. By C. M. Möller, Jörgen Abell, Thöger Jagd, Flemming Juncker, comp. and intro. by S. O. Heiberg. 92 pp. Illus. State Univ. of New York College of Forestry, Syracuse 10. 1954. World Forestry Ser. Publ. No. 1; Tech. Publ. No. 76. 80 cents.

Variations in Monterey Pine. By J. M. Fielding. 43 pp. Illus. Australia Forestry and Timber Bureau, Canberra. 1953. Bul. No. 31.

Wood Technology and Utilization

The Strength Properties of Plywood. Part. I. By T. Curry. 10 pp. Illus. Dept. of Sci. and Indus. Research, London, England. 1953. Forest Products Research Bul. No. 29. 1s. 3d.

Society Affairs

Officers and Members of the Council, 1954-1955

E. L. DEMMON, *President*
Southeastern Forest Experiment Station
Federal Building
Asheville, N. C.

WILLIAM J. BROWN
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Kimberly-Clark Corporation
Neenah, Wis.

C. HUXLEY COULTER
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Portland 8, Ore.

RUTHFORD H. WESTVELD
Department of Forestry
University of Missouri
Columbia, Mo.

Annual Meeting

Society of American Foresters

Milwaukee, Wis., October 24-27, 1954

Theme: "Our Changing Forests"

Schedule of Events

Members, their ladies, and guests who plan to attend the meeting are urgently requested to arrive in Milwaukee on Sunday, October 24, or not later than the morning of Monday, October 25. The opening general session starts on Monday morning.

As will be seen from the following schedule of events, numerous meetings and sessions have been arranged to provide attractions for a diversity of interests. The September issue of the JOURNAL will contain the final program of topics and speakers.

Sunday, October 24

S.A.F. Council, morning and afternoon meeting.

JOURNAL OF FORESTRY Editorial Board, evening conference.

Committee on Accrediting, evening conference.

Joint meeting of Council and Section delegates, evening.

Council of State Forestry Association Executives, afternoon and evening.

Association of Consulting Foresters, evening.

Monday, October 25

General meeting, morning.

Society Affairs session, afternoon.

Division of Education, evening.

Division of Public Relations, evening.

Division of Watershed Management, evening.

Tuesday, October 26

Division of Forest Products, morning.

Division of Forest Recreation, morning.

Division of Silviculture, morning and afternoon.

Division of Private Forestry, afternoon.

Division of Forest-Wildlife Management, afternoon.

Social evening and college alumni get-togethers, evening.

Wednesday, October 27

Division of Economics and Policy and Division of Education, joint meeting, morning.

Division of Forest Management, morning and afternoon.

Division of Range Management, afternoon.

S.A.F. Social Hour and Dinner, evening.

General Meeting

Monday, October 25

Jay H. Price, Chairman

Morning Session

Theme: "Our Changing Forests."

1. Introduction by the Chairman.

2. "The Forests of the Central and Lake States Region." M. B. Dickerman, Lake States Forest Experiment Station, St. Paul, Minn.

3. "Problems and Potentials of the Fiber Industry."

"The Northern Forests." D. Clark Everest, Marathon Corporation, Rothschild, Wis.

"A Look Across the Border." J. F. Sharpe, Department of Lands and Forests, Toronto, Ont., Canada.

4. "Utilization of Central Hardwoods." Burton F. Swain, National Veneer and Lumber Company, Seymour, Ind.

5. "Management of Our Changing Forests."

"The Northern Forests." J. B. Millar, Kimberly-Clark Corporation, Neenah, Wis.

"The Central Hardwoods." R. H. Westveld, Department of Forestry, University of Missouri, Columbia, Mo.

Society Affairs

Monday, October 25

E. L. Demmon, President
DeWitt Nelson, Vice President

Afternoon Session

1. Report of the President, E. L. Demmon.
2. Report of the Executive Secretary, Henry Clepper.
3. Report of the Editor, Arthur B. Meyer.
4. "The Society's Forestry Research Project." Frank H. Kaufert, Director.
5. Committee Reports.

Open forum discussion.

Division of Education

Monday, October 25

Kenneth P. Davis, Chairman
Archie E. Patterson, Vice Chairman
J. Whitney Floyd, Secretary

Evening Session

1. "The Place of Forest Fire Control in Forestry School Curriculums." R. Keith Arnold, School of Forestry, University of California, Berkeley, Calif.

Discussion.

2. "They Received Forestry Honors." J. S. Illick, College of Forestry, State University of New York, Syracuse, N. Y.
3. Symposium: "Master's Degrees in Forestry Schools." Moderator: Kenneth P. Davis, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

"Status, Trends, and Perspective in Master Degree Programs." Myron Krueger, School of Forestry, University of California, Berkeley, Calif.

"Building a Master's Degree Program on a Liberal Arts Foundation." Clarence F. Korstian, School of Forestry, Duke University, Durham, N. C.

"Building a Master's Program on an Undergraduate Degree in Forestry." Ernest O. Wohletz, College of Forestry, University of Idaho, Moscow, Idaho.

"Employer Viewpoints":

(1) Private Industry.

(2) Public. H. Dean Cochran, U. S. Forest Service, Milwaukee, Wis.

General Discussion by Panel.

Open Discussion by members.

Division of Public Relations

Monday, October 25

Ralph G. Unger, Chairman
Albert K. Wiesendanger, Vice Chairman
C. W. Mattison, Secretary

Evening Session

1. "Trees and People." Melvin N. Taylor, Trees for Tomorrow, Inc., Merrill, Wis.

Discussion.

2. "Forestry Extension in Indiana." Edgar J. Lott, Agricultural Extension Service, Lafayette, Ind.

Discussion.

Division of Watershed Management

Monday, October 25

Marvin D. Hoover, Chairman
Robert E. Dils, Vice Chairman
James J. Byrne, Secretary

Evening Session

1. Panel Discussion: "Do Foresters Face Watershed Management Problems in the Lake States?" Moderator: P. A. Herbert, Division of Conservation, Michigan State College, East Lansing, Mich.

Participants: Chester Wilson, Director (retired), Minnesota Department of Conservation, St. Paul, Minn.

R. D. McCulley, Lake States Forest Experiment Station, St. Paul, Minn.

F. G. Kilp, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

K. W. Udd, U. S. Forest Service, Duluth, Minn.

2. Business meeting.

Division of Forest Products

Tuesday, October 26

R. C. Fraunberger, Chairman
Lincoln A. Mueller, Vice Chairman
Russell Stadelman, Secretary

Morning Session

Theme: "Recent Developments in Forest Products in the North Central States."

1. "A New Hardwood Pulpwood Creates Opportunities for Better Forestry in Ohio." W. H. Hildebrand, Mead Paper Corporation, Chillicothe, Ohio.

Discussion.

2. "Problems Resulting from Mechanization in Harvesting Forest Products." Leland J. Hooker, Forest Products Research Laboratory, Michigan College of Mining and Technology, Houghton, Mich.

Discussion.

3. "Trends in Machine Planting." C. A. Samuelson, William Bonifas Lumber Company, Marquette, Mich.

Discussion.

4. "Trends in the Veneer and Plywood Industry of the North Central States." H. O. Fleischer and T. R. Truax, both of the Forest Products Laboratory, Madison, Wis.

Discussion.

5. "The Effects of Recent Developments in Furniture Manufacturing on Wood Use." Stephen B. Preston, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

Discussion leader: Fred E. Dickinson, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

Division of Forest Recreation

Tuesday, October 26

Harthon L. Bill, Chairman
William N. Parke, Vice Chairman
Donald Duncan, Secretary

Morning Session

1. "The Contradiction of Wilderness Preservation in a Democracy." James P. Gilligan, Department of Forestry, Oklahoma Agricultural and Mechanical College, Stillwater, Okla.
2. "Management of the Itasca State Park Forest to Meet Recreational Objectives." Henry L. Hansen and Donald P. Duncan, School of Forestry, University of Minnesota, St. Paul, Minn.
3. "Recent Mining Activities in and adjacent to the Roadless Areas of the Superior National Forest." Galen W. Pike, U. S. Forest Service, Duluth, Minn.
4. "Quality Standards for Forest Recreation and Wildlife Production and Harvest." J. V. K. Wagar, Colorado A & M College, Ft. Collins, Colo.

Division of Silviculture

Tuesday, October 26

Philip A. Briegleb, Chairman
J. W. Duffield, Vice Chairman
Henry L. Hansen, Secretary

Morning Session

1. "A Decade of Development in Forest Practices: 1940-1950." Kenneth P. Davis, Department of Forestry, University of Michigan, Ann Arbor, Mich.
2. "The Gross Yield of Douglas-fir in the Pacific Northwest." George R. Staebler, Pacific Northwest Forest and Range Experiment Station, Olympia, Wash.
3. "Early Growth Response of Central Hardwoods to Management." Leon S. Minckler, Central States Forest Experiment Station, Carbondale, Ill.
4. "Hardwood Tree Grades as a Silvicultural Tool in the Management of Cumberland Plateau Hardwoods." Henry W. Smith, Jr., Department of Forestry and Engineering, The University of the South, Sewanee, Tenn.
5. "Draining Swamps to Improve Slash Pine Sites in North Florida." Donald D. Stevenson, The Buckeye Cellulose Corporation, Foley, Fla.
6. "Where Does Thinning Fit into the Management of Lake States Pulpwood Stands?" Otis Hall, School of Forestry, University of Minnesota, St. Paul, Minn.

Afternoon Session

Symposium: "Coordinating Silvicultural Objectives and Practices with Wood Quality and Species Requirements in the Forest Industries."

Moderator: T. D. Stevens.

1. "Prospective Wood Quality and Species Requirements in the Forest Industries." J. A. Hall, Forest Products Laboratory, Madison, Wis.

2. "The Case for 'Cellulose' Forestry." Russell Watson, Consulting Forester, Manistique, Mich.

3. "Composition and Quality Objectives for the Aspen Type: Aspen Management in the Lake States." Z. A. Zasada, Lake States Forest Experiment Station, Grand Rapids, Minn.

4. "Silvicultural Problems in Central States Forests: Composition and Quality Objectives." L. E. Sawyer, Indiana Coal Association, Terre Haute, Ind.

5. "Successional Trends of Forest Vegetation and Future Wood Supplies." Henry L. Hansen, School of Forestry, University of Minnesota, St. Paul, Minn.

6. Report of Committee on Forest Tree Improvement. Scott S. Pauley, Harvard University, Petersham, Mass.

7. Other committee reports.

Division of Private Forestry

Tuesday, October 26

E. Stanley Hurd, Chairman
Arthur W. Nelson, Vice Chairman
Edwin J. Jankowski, Secretary

Afternoon Session

1. "The Lake States Council of Industrial Foresters. What Is it?" Bruce G. Buell, Northern Paper Mills, Green Bay, Wis.

2. "Industry Forest Management Research in the Lake States." B. L. Berklund, Nekoosa-Edwards Paper Company, Port Edwards, Wis.

3. "Industry Forest Management Research in the United States." W. H. Cummings and F. H. Kaufert, Society of American Foresters Forestry Research Project, St. Paul, Minn.

4. "Forests and the Mining Industry in the Lake States." R. H. Ewalt, The Cleveland-Cliffs Iron Company, Negaunee, Mich.

5. "Railroads and Forestry in the Lake States." W. A. Kluender, Chicago and North Western Railway System, St. Paul, Minn.

6. "Trees for Tomorrow—An Industrial Approach to Resource Management." M. N. Taylor, Trees for Tomorrow, Inc., Merrill, Wis.

Division of Forest-Wildlife Management

Tuesday, October 26

J. V. K. Wagar, Chairman
Ralph T. King, Vice Chairman
Herman F. Olson, Secretary

Afternoon Session

1. "Wildlife Management as a Part of Multiple-Use Forestry—Status and Prospects." Ralph T. King, Department of Forest Zoology, State University of New York, Syracuse, N. Y.

Discussion leader: Harold G. Wilm, College of Forestry, State University of New York, Syracuse, N. Y.

2. "The Wisconsin Cooperative Forest-Wildlife Program: The Forester's Viewpoint." Dan E. Bulfer, U. S. Forest Service, Rhinelander, Wis.

3. "The Wisconsin Cooperative Forest-Wildlife Program: The Wildlife Manager's Viewpoint." J. R. Smith, Game Management Division, Wisconsin Conservation Department, Madison, Wis.

4. Report of Committee to Integrate Professional Forestry, Range Management, and Wildlife Management Responsibilities. Paul Hickie, Fish and Wildlife Service, U. S. Department of the Interior, Denver, Colo. David F. Costello, U. S. Forest Service, Portland, Ore. Ralph R. Hill, U. S. Forest Service, Denver, Colo.

Joint Meeting

Wednesday, October 27

Division of Forest Economics and Policy

William A. Duerr, Chairman
Henry J. Vaux, Vice Chairman
M. B. Dickerman, Secretary

Division of Education

Kenneth P. Davis, Chairman
Archie E. Patterson, Vice Chairman
J. Whitney Floyd, Secretary

Morning Session

Symposium: "Economics in the General Forestry Curriculum."

1. "The Demand: What Training in Economics and Business Do Employers Want in the General Forestry Graduate?" Lawrence J. Kugelman, International Paper Company, New York, N. Y.

2. "The Supply: What Training in Economics and Business Are the Schools Giving the General Forester?" Albert C. Worrell, School of Forestry, University of Georgia, Athens, Ga.

3. "Some Ideas for Better Meeting the Demand."

"Through General Courses in Economics and Business." Paul G. Keat, College of Forestry, State University of New York, Syracuse, N. Y.

"Through Courses in the Economics of Forestry." Ernest Wohletz, College of Forestry, University of Idaho, Moscow, Idaho.

"Through the Teaching of Economics and Business in Other Courses." Allyn M. Herrick, Department of Forestry, Purdue University, Lafayette, Ind.

4. Comments.

"On the Demand." Russell N. Cunningham, Lake States Forest Experiment Station, St. Paul, Minn.

"On the Supply." Charles H. Stoddard, Independent Timber Farmers of America, Minneapolis, Minn.

"On the Proposals." Otis F. Hall, School of Forestry, University of Minnesota, St. Paul, Minn.

"By Way of Summary." J. Willcox Brown, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

Division of Forest Management

Wednesday, October 27

Merle S. Lowden, Chairman
Myron B. Savage, Vice Chairman
R. Keith Arnold, Secretary

Morning Session

Protection

1. "Fire Control Progress in the Lake States." J. A. Mitchell, Lake States Forest Experiment Station, St. Paul, Minn.

2. Symposium: "Cooperative Approaches to Fire Control."

"Fire Compacts and Their Use." Arthur S. Hopkins, Northeastern Forest Fire Protection Compact, Chatham, N. Y.

"Cooperative Logging Slash Studies in Idaho." George Fahnestock, Intermountain Forest and Range Experiment Station, Missoula, Mont.

"Cooperative Suppression." R. C. Winkworth, Department of Conservation and Development, Raleigh, N. C.

"Operation Firestop." R. Keith Arnold, School of Forestry, University of California, Berkeley, Calif.

Discussion.

3. "Forest Insect Surveys in the Lake States." Daniel Benjamin, Department of Entomology, University of Wisconsin, Madison, Wis.

4. "Progress in Meeting the Oak Wilt Threat."

Afternoon Session

Photography and Mensuration

1. "Practical Photo Interpretation for the Forest Manager." Karl E. Moessner, Central States Forest Ex-

periment Station, Columbus, Ohio.

2. "Application of Area Control in Regulation." Perry Fassett, U. S. Forest Service, Cass Lake, Minn.

3. "Continuous Forest Inventory Using Business Machine Methods." John Wright, Union Bag and Paper Company, Savannah, Ga.

State Comments. Harold Kollmeyer, Michigan Department of Conservation, Lansing, Mich.

Industry Comments.

Discussion leader: A. E. Wackerman, School of Forestry, Duke University, Durham, N. C.

Forest Administration

1. **Symposium: "Scientific Management in Forestry."**

"Its Place in National Forest Administration." L. K. Mays, U. S. Forest Service, Portland, Ore.

"Its Place in State Forestry Administration."

"Its Place in Industrial Forest Administration."

"Its Place in Forestry Education."

2. "Where Does Thinning Fit into the Management of Lake States Pulpwood Stands?" Otis Hall, School of Forestry, University of Minnesota, St. Paul, Minn.

3. "Chemical Herbicides as a Tool in Forest Management." John Arend, Lower Peninsula Forest Research Center,. East Lansing, Mich.

4. Business meeting.

Division of Range Management

Wednesday, October 27

M. W. Talbot, Chairman
Charles E. Poulton, Vice Chairman
Bert H. Tucker, Secretary

Afternoon Session

Panel Discussion: "Integration of Grazing and Timber Growing."

1. Introductory remarks by Chairman of the Division.

2. "Forest Grazing in the Deep South." Robert S. Campbell, Southern Forest and Range Experiment Station, New Orleans, La.

3. "Effect of Grazing on Timber in the Lake States." Fred B. Trenk, Extension Service, University of Wisconsin, Madison, Wis.

4. "Grazing and Timber Production in the Ozarks." George O. White, Missouri Conservation Commission, Jefferson City, Mo.

5. "Effect of Grazing on Ponderosa Pine Reproduction in the Southwest."

6. "Harmonizing Forestry and Range Management on the Pacific Coast."

Society Dinner

Wednesday, October 27

George Banzhaf, Toastmaster

Presentation of the Gifford Pinchot Medal by President E. L. Demmon.

Presentation of the Sir William Schlich Memorial Medal by President Demmon.

Address, "A Broad Look at Our Resource Problem." Reuben G. Gustavson, President and Executive Director, Resources for the Future, Inc., Washington, D. C.

Entertainment.

Ladies' Events

Ladies are cordially invited. There will be a special ladies lounge in the Schroeder Hotel with local hostesses on hand.

A tea has been arranged for Monday afternoon, October 25, to be followed by bridge, and possibly an evening concert.

On Tuesday, an auto tour with luncheon on the lake shore and a drive through Brown Deer Park and Wauwatosa. That evening members and their ladies have been invited to an evening of conviviality as the guests of the Milwaukee breweries.

On Wednesday morning there will be a tour of one of Milwaukee's art museums, followed by movies and lectures on the nationalities, customs, and costumes of Wisconsin, and on regional art. That evening the annual Society reception and dinner will be held in the Schroeder Hotel.

Hotel Reservations

All scheduled events will be held in the Schroeder, a hotel of 850 rooms. However, the Schroeder will not be able to accommodate all those attending the meeting, hence other hotels are cooperating.

Members should send reservation requests direct to the hotel of their choice. The reservation coupon printed herewith is for their convenience. Those who do not wish to clip the coupon from the JOURNAL may request a reservation by supplying the necessary information.

In any case, be sure to list first, second, and third choice hotels, and identify yourself as attending the meeting of the Society of American Foresters.

There follows a list of cooperating hotels in Milwaukee and their daily rates. They are listed according to size, and their convenience to the Schroeder. All room prices quoted are with bath, unless otherwise noted. Some hotels have rooms with connecting bath at lower rates.

Hotels

Schroeder Hotel, 509 West Wisconsin Avenue, Milwaukee 3. Single, $5 to $10; double, $7 to $10; twin beds, $8.50 to $12. Suites available.

Wisconsin Hotel, 720 North 3rd Street, Milwaukee 3. (Three blocks from Schroeder.) Single, $4.50 to $8; double, $6.50 to $10; twin beds, $9 to $10.

Medford Hotel, 607 North 3rd Street, Milwaukee 3. (Three blocks from Schroeder.) Single, $4 to $5; double, $6 to $7; twin beds, $7.50 to $9.

Plankinton House, 609 North Plankinton Avenue, Milwaukee 3. (Five blocks from the Schroeder.) Single, $5 to $10; double, $7 to $8.50; twin beds, $8 to $12.

Pfister Hotel, 424 East Wisconsin Avenue, Milwaukee 2. (Eight blocks from the Schroeder.) Single, $5 to $9; double, $7 to $10; twin beds, $7.50 to $12.

Tower Hotel, 11th & West Wisconsin Avenue, Milwaukee 3. (Six blocks from the Schroeder.) Single, $4.50 to $5; double, $5.50 to $7; twin beds, $6.50 to $8.

Towne Hotel, 723 North 3rd Street, Milwaukee 3. (Three blocks from the Schroeder.) Single, $4 to $6; double, $5 to $6.50; twin beds, $6.50 to $8.

In addition to the foregoing hotels, there are other good hotels outside the downtown area, and smaller hotels within the downtown area. A complete list of all city hotels and their rates may be obtained from the Convention Bureau, Milwaukee Association of Commerce, 611 North Broadway, Milwaukee 2, Wis.

Motels

Within a radius of fifteen miles from the Schroeder Hotel are at least two dozen motels and tourist courts with rates varying from $5 to $9 for a party of two.

A list of these motels can be obtained from the Association of Commerce, whose address is given above, or from the S.A.F. Committee on Hotel Reservations, the chairman of which is Edward Ritter, U. S. Forest Service, 623 N. 2nd Street, Milwaukee 3, Wis.

Meeting Committees

The general chairman for the meeting is H. Dean Cochran, regional forester, U. S. Forest Service, 623 North 2nd Street, Milwaukee 3, Wis.

Assisting him are the following committees and their personnel.

Program Committee

The chairman of the program committee is Kenneth P. Davis, School of Natural Resources, University of Michigan, Ann Arbor, Mich.

The other members are Bruce G. Buell, H. E. Ochsner, Clarence Prout, and L. E. Sawyer.

Arrangements Committee

The chairman of the Committee on Arrangements is Merle S. Lowden, U. S. Forest Service, 623 North 2nd Street, Milwaukee 3, Wis.

Assisting him is H. J. MacAloney and heading up the special task committees are the following:

Publicity: H. K. Pyles.
Reception: Fred G. Wilson.
Entertainment: Stanley Locke.
Hotel Reservations: Edward Ritter.
Meeting Rooms: John Von Bargen.
Field Stops: Allan Haukom.
Ladies Events: Mrs. Ray Bassett.

The President's Column

E. L. DEMMON

The Society of American Foresters is now recognized by other professional societies as a professional organization of technically trained foresters. In selecting members, we place high stress on broad professional training and experience. We pride ourselves on the technical accomplishments of our members, and take due credit for the progress of American forestry since the Society was organized in 1900. We have an excellent Code of Ethics. Our JOURNAL OF FORESTRY contains articles of scientific interest and value. Our meetings are forums for worthwhile technical discussions.

Although other technical and scientific groups consider us a profession, what does the general public think of us? I believe it is fair to say that the

Society of American Foresters
Annual Meeting
Milwaukee, Wis., October 24-27, 1954

....., 1954

First Choice Hotel .....

Second Choice .....

Third Choice .....

Please make a reservation for the following room accommodations

for arrival on October ..... a.m. p.m. Departure date, October .....

I understand that accommodations will be provided at the daily rate specified, if available; otherwise the next nearest rate will apply.

..... Single room with bath. Rate $ .....

..... Double-bed room with bath. Rate $ .....

..... Twin-bed room with bath. Rate $ .....

..... Suite (parlor, twin-bed room, and bath). Rate $ .....

..... Other (specify accommodations desired). .....

..... Rate $ .....

The above room accommodations are requested for the following persons, in addition to myself. (Print or type names and addresses legibly.)

.....

.....

.....

My name: .....

Street address: .....

City, zone, state: .....

FISCAL YEAR MEMBERSHIP CAMPAIGN SCHOOL BOX SCORE

School	Student Applications Received: August listing	Total fiscal year
Alabama Polytechnic Institute	1	7
University of California	1	21
Colorado A & M College	0	17
Duke University	0	12
University of Florida	0	16
University of Georgia	1	36
University of Idaho	1	29
Iowa State College	0	26
Louisiana State University	0	14
University of Maine	0	15
University of Massachusetts	0	16
Michigan State College	0	25
University of Michigan	5	22
University of Minnesota	1	20
University of Missouri	0	19
Montana State University	1	19
State University of New York	0	23
North Carolina State College	0	19
Oregon State College	1	17
Pennsylvania State University	1	33
Purdue University	1	19
Utah State Agricultural College	0	8
University of Washington	1	27
West Virginia University	2	16
Yale University	1	3
Totals	18	479

FISCAL YEAR MEMBERSHIP CAMPAIGN SECTION BOX SCORE

Section	Proposed 1954 quota	Applications Received[1]: August listing	Total fiscal year
Allegheny	100	3	60
Appalachian	100	1	45
Central Rocky Mountain	45	0	24
Central States	110	6	79
Columbia River	140	5	50
Gulf States	105	4	53
Inland Empire	30	1	38
Intermountain	30	0	11
Kentucky-Tennessee	30	2	5
New England	95	3	51
New York	65	0	39
Northern California	120	3	33
Northern Rocky Mountain	30	1	35
Ozark	55	4	43
Puget Sound	80	1	56
Southeastern	145	3	114
Southern California	20	0	2
Southwestern	35	0	7
Upper-Mississippi Valley	60	1	54
Washington	45	0	7
Wisconsin-Upper Michigan	60	2	6
Totals	1,500	40	812

[1]Student, Junior, Affiliate, Associate (initial) grades only.

average man on the street still thinks of us largely as a group of forest rangers, our principal job being to protect forests from fire, or to plant trees.

No doubt the more general recognition of forestry as a profession by the public will come in the course of time; but we can speed that time in various ways. First, we should not be hesitant in letting the world know of our accomplishments, and in every legitimate way we should publicize and stress the professional character of our work and its value in the public interest. This means obtaining more publicity for technical accomplishments, greater coverage for our technical sessions, particularly at the local level, and stressing the value of our work locally as well as regionally and nationally; and informing the general public that professional foresters as represented by the Society of American Foresters in its relations to the public subscribes to high standards of professional conduct.

No one questions the public value and need for such professions as medicine, law, engineering, and architecture, all of which maintain high standards for admission to their ranks, with State registration required before they are allowed to practice. Foresters have only recently reached the discussion stage as regards registration. One State (Georgia) restricts the use of the title "Registered Forester" to those who qualify for registration following an examination. Three Canadian Provinces require registration of foresters before full professional status as practicing foresters is attained. Also I noted in a recent issue of the JOURNAL that a Society member working as a consulting forester in New York State had been granted exemption from the provisions of the New York State Unincorporated Business Tax on the ground that he was a professional man in the same category as law, medicine and others specifically named in the statute. Discussions of the pros and cons of recommending State legislation for the licensing of practising foresters is all to the good, and professional foresters themselves should be the first to set forth the qualifications for their profession, and work for appropriate legislation. One thing is certain—not only should we ourselves feel and act like professional men; we must be accepted as such by the general public, and it is up to us to prove worthy of this responsibility through our actions and accomplishments.

Since our Society represents the forestry profession in America, why is it that so many qualified and practising foresters are not now members? It is difficult to understand why almost 40 percent of men eligible for membership in our Society are not yet in our ranks; and that one-fifth of these nonmembers were members at one time but have dropped out for one reason or another. Of course many of these nonmembers have drifted off into other lines of work, but a great many are still in forestry work and are potential members.

Let us consider these facts as professional men. Where have we failed in not attracting a greater proportion of qualified foresters to the ranks of our Society? This is a question that each Section and Chapter might well pose at future meetings. Let's go out and bring some of those 4000 nonmembers into the fold and let us keep them in by making them proud to be members of the Society and actively associated with the profession of forestry in America.

E. L. Demmon

National Science Roster

Early this year all members of the Society of American Foresters were sent questionnaires prepared by the National Science Foundation, and mailed by the American Institute of Biological Sciences. The questionnaires were for the purpose of developing a national roster of scientific and technical personnel, for use if and when needed in the interests of national defense.

More than 5000 questionnaires were returned by S.A.F. members. Personnel data have been tabulated in preparation for punching on IBM cards.

About 1000 questionnaires were received by the A.I.B.S. from foresters whose degrees were awarded since 1950. Since the restriction imposed by the Science Foundation for inclusion in the register is a baccalaureate degree plus four years of experience or further training, these members will be contacted again at a later date.

Report of Midyear Council Meeting

The midyear meeting of the Council of the Society was held June 13-15, 1954, at the University of Michigan League, Ann Arbor, Mich.

Present were President E. L. Demmon, Vice President DeWitt Nelson, William J. Brown, C. Huxley Coulter, Stanley G. Fontanna, P. D. Hanson, E. F. Heacox, J. S. Illick, J. Herbert Stone, R. H. Westveld; and Henry Clepper, executive secretary. D. B. Demeritt was unavoidably absent.

1954 Annual Meeting

The program and arrangements for the S.A.F. annual meeting at Milwaukee, October 24-27, were discussed. It was decided to hold a combined meeting of the Council and the officially designated delegates of the Sections on Sunday evening, October 24, in the Schroeder Hotel.

Three items for discussion will be (1) the Society's budget, (2) S.A.F. membership standards and procedures, and (3) tenure of office (one or two years) of Section officers. Time permitting, additional items as may be presented by Section delegates will be considered.

This will not be an open meeting. It is primarily for the purpose of providing information about Society business matters of interest to national and Section officers.

Proceedings of 1954 Meeting

A large number of articles (more than a six-month supply) await publication in the JOURNAL. Because of the probability that the estimated 50 or more papers presented at the annual meeting in Milwaukee will increase the backlog, with consequent further delay in their publication, the Council discussed the desirability of publishing a *Proceedings* of the meeting.

On motion by Mr. Heacox, seconded by Mr. Fontanna, the Council unanimously approved the publication of the *Proceedings* of the 1954 meeting, with the understanding that the registration fee shall include the estimated cost of the *Proceedings*. As in the past, a registration fee shall not be charged forestry students and ladies.

1955 Annual Meeting

In accordance with the Society's system of rotating meetings by geographical regions, the 1955 meeting will be held in Portland, Ore., October 16-19. The Multnomah Hotel will be the headquarters.

1956 Annual Meeting

The 1956 annual meeting, under the established rotation system, is scheduled for the South. An invitation from the Kentucky-Tennessee Section to hold the meeting in Memphis was submitted last November to the Council. This invitation has been supported by the Southeastern, Gulf States, and Ozark Sections.

A second invitation was subsequently received from the Allegheny Section to hold the meeting in Baltimore, in observance of the fiftieth anniversary of forestry in Maryland. In the discussion it was brought out that the 1956 meetings of the American Forestry Association and the Association of State Foresters may be held in Maryland.

On motion by Mr. Brown, seconded by Mr. Heacox, the Council voted unanimously to follow the rotation system and hold the 1956 meeting in Memphis.

The dates will be October 14-17. The Peabody Hotel will be the headquarters.

World Forestry Congress

Announcement was made in the April issue of the JOURNAL (page 307) of the Fourth World Forestry Congress to be held in Dehra Dun, India, December 11-22, 1954. The Society has received an official invitation to be represented at the Congress.

On motion by Mr. Nelson, seconded by Dr. Illick, the Council unanimously named Tom Gill as the leader of the Society's delegation. Mr. Gill, who is chairman of the S.A.F. Committee on International Relations, and Executive Secretary Clepper were authorized to designate as additional delegates other members who may attend. Those so designated will be official representatives of the Society, in addition to whatever delegations they may be a part of.

The Council believes it may be helpful to appoint this official delegation as occasions frequently arise at these Congresses when it is desirable for the Society to take official action.

In addition to possibly six U. S. governmental delegates to be designated by the State Department, it is expected that at least ten to fifteen American foresters will participate.

Policy on Accrediting

Ever since the Society began its accrediting activities in 1935, all costs in connection with the evaluation of schools of forestry, including the expenses of visiting committees to the institutions under examination, were borne by the Society.

In 1953, the Council voted to discontinue the Society's independent accrediting work, and to undertake accrediting cooperatively with the several regional associations of colleges and universities, on a trial basis. This decision was taken at the request of the National Commission on Accrediting. The other professional societies active in accrediting had likewise agreed to the new procedure.

No institution has as yet been examined by the Society of American Foresters under the new procedure, but it is expected that the universities of California and Idaho and the Pennsylvania State University will be scheduled for examination during 1954 and 1955. In accordance with this procedure, representatives of the professional societies will evaluate the institutions in company with representatives of the regional educational associations. Institutions visited will be expected to reimburse members of the evaluation committee for necessary travel and substance expenses except

in those cases when the committee members receive such reimbursement from other sources.

Until the Society has gained experience in working with the regional education associations, some forestry educators believe that the Society should continue to assume the expenses of accrediting, and not request reimbursement from the institutions concerned. Then, should the Society's relations with any regional association, or with the National Commission on Accrediting, so develop as to make it undesirable to participate further in the accrediting procedures, the Society can withdraw from the cooperative relationship without embarrassment, having paid its own way. It is estimated that such expenses to the Society will not exceed $500 during 1954.

On motion of Mr. Heacox, seconded by Mr. Stone, the Council voted unanimously to assume responsibility for the expenses of its designated representatives in cooperative accrediting activities with the regional educational associations.

(Members desiring more background information on this subject are referred to the report of the Council meeting, held May 21-23, 1953, as published in the JOURNAL for July 1953, pages 516-517.)

Report on Membership

The following report on the status of membership as of May 31 (the end of the first half of the fiscal year) was prepared by Miss L. A. Warren.

The Sections, schools, and individual members have given outstanding cooperation in the 1954 membership campaign. The quota system appears to have been an incentive and the schools and Sections have engaged in friendly competition. Applications received in initial grades only, as listed in the December-June issues of the JOURNAL OF FORESTRY total 701, or about 47 percent of the quota of 1,500 set for the year.

The Inland Empire Section has already exceeded its annual quota; the Northern Rocky Mountain and Upper Mississippi Valley Sections are close to theirs. The Southeastern Section, for some years the leading Section numerically and, consequently, having the highest 1954 quota (145), is within 39 of its goal. Seven Sections have about reached their midway point. Ten Sections appear to be lagging, but it was to be expected that a few Sections might not meet their quotas.

Through the June JOURNAL 422 applications for Student Membership have been received. The University of Georgia leads in the number of applications.

TABLE 1.—COMPARATIVE S.A.F. MEMBERSHIP, AS OF MAY 31

Grade	1953	1954
Fellow	62	71
Member	3,640	3,851
Junior	4,318	4,400
Student	723	721
Affiliate	434	527
Associate	212	218
Corresponding	61	64
Honorary	13	15
	9,463	9,867
Increase	....	404

As an aid to building a list of prospective members for the Sections over 1,000 cards of nonmembers (recent graduates from accredited forestry schools) were sent to the Sections from the Society office. A letter also went to over a dozen industrial forestry companies which sent the Society a list of their forestry employees. These lists were checked against the Society membership, and the names of nonmembers sent to the respective Sections. The techniques used in obtaining new members for 1954 have worked so successfully that the plan will be continued during 1955.

As of May 31, total membership was 9,867, a net increase of 404 over the same period of 1953. In view of the drop in forestry graduates from a high of 2,321 in 1950 to 1,027 in 1953, this increase in membership is significant. If the same monthly net increase is maintained the membership at the end of 1954 will exceed 10,000.

"Retired" Members

Article V, Section 4 of the Constitution reads as follows: "Members and Fellows who retire from active forestry practice, after having been members of the Society for 20 years or more, may upon application to the Council continue as voting members but have their dues remitted except for an annual charge of $5 should they desire to receive the JOURNAL OF FORESTRY and other Society publications."

Since the adoption of this provision, numerous members have applied for "retired" membership status. As of May 31 there was a total of 174, of whom 62 paid no dues at all and did not receive the JOURNAL, and 112 who paid $5 per year and received the JOURNAL.

In recent years, some who had been Members for 20 years and who had left forestry for other fields, usually at higher compensation, have applied for the "retired" status and reduced payment. Their claim was that since they were no longer in forestry, they had in effect retired, though actually they had not given up fulltime employment.

In order to provide guidance for the executive office in acting on such requests, the Council Committee on Membership (Chairman Westveld, Coulter, and Heacox) was asked to

TABLE 2.—MEMBERSHIP BY SECTIONS MAY 31, 1954

Section	Rank	Total	Junior	Member	Fellow	Affiliate	Associate	Student
1. Allegheny	7	611	267	241	5	16	14	68
2. Appalachian	5	653	296	281	4	21	6	45
3. Central Rocky Mountain	14	268	87	135		4	4	38
4. Central States	6	627	301	196	2	18	10	100
5. Columbia River	2	891	445	352	5	38	14	37
6. Gulf States	4	666	311	225	2	83	14	31
7. Inland Empire	17	214	96	73	2	10	5	28
8. Intermountain	19	187	64	106	....	3	....	14
9. Kentucky-Tennessee	20	185	69	98	....	7	6	5
10. New England	8	601	235	238	5	57	19	47
11. New York	10	405	146	189	4	16	16	34
12. Northern California	3	739	353	282	9	42	23	30
13. No. Rocky Mountain	18	208	95	88	1	2	1	21
14. Ozark	13	344	150	116	1	38	4	35
15. Puget Sound	9	542	226	208	5	47	11	45
16. Southeastern	1	974	550	292	2	38	17	75
17. Southern California	21	103	47	38	2	8	3	5
18. Southwestern	16	218	108	93	1	14	1	1
19. Upper Miss. Valley	11	381	160	145	2	16	10	48
20. Washington	15	258	49	166	12	4	26	1
21. Wis.-Upper Michigan	12	377	154	164	1	36	12	10
No Section Affiliation[1]		336	191	125	6	9	2	3
Corresponding		64						
Honorary		15						
Total Membership		9,867	4,400	3,851	71	527	218	721

[1]Includes 127 inactive and other members in U. S. and foreign countries who have requested that they not be designated as members of any Section.

THE STORY OF TREE FARMING

One of a series of advertisements appearing in several national magazines in the interest of better public understanding of tree farming and the forest products industry.

BEAR AND CUBS in old burn on a western tree farm. The new tree crop will not mature for nearly 100 years. When all near-by seed trees are burned such areas must be hand-planted with seedlings from industry nurseries.

Keep America Green . . . it is important to everyone

Western red cedar provides a durable and weather-resistant exterior for this home. Wood's many species can be used inside or out to create a home of beauty and charm.

When a forest burns, everyone loses. Large quantities of both wood and wildlife are destroyed. Burned areas are no longer useful for recreation or as a habitat for game. Much wood that people could have used in the form of lumber, plywood and cellulose products is lost forever. Today, such losses are being reduced because the public is exercising more care . . . and by cooperative fire prevention programs which are maintained by private industry, federal and state forest agencies.

On industrial tree farms, fire prevention and control is an important part of forest management planning. Tree farmers build and patrol many thousand miles of fire-access roads to protect their timber. They invest millions of dollars in modern, mechanized equipment, radio communications and the training of personnel to fight forest fires. America's tree farms are the world's best-protected timberlands.

Today, about 31 million acres of tax-paying forestland are managed as tree farms by more than 5,200 private owners. All timberlands owned by this company are operated as tree farms. *Write us at Box A, Tacoma, Washington for a free booklet,* ***Tree Farming in the Pacific Northwest.***

Weyerhaeuser Timber Company

WEYERHAEUSER
4-TOMBER

submit an interpretation of the Constitution.

On motion by Mr. Coulter, seconded by Mr. Nelson, the following policy was unanimously adopted.

"Retirement from active forestry practice, as provided in Article V, Section 4, shall be interpreted as applying to members retired from fulltime employment, either in forestry or other fields, with consequent substantial reduction in the income of the members concerned."

Directory of Members

The latest directory of members was published as a supplement to the August 1950 issue of the JOURNAL. It contained about 7,000 listings in 72 pages. A total of 8,100 copies was printed and distributed at a cost of $3,151. Eleven Sections voluntarily contributed $445 toward the expense, making a net cost to the Society of $2,706.

A new directory containing 10,000 listings would require at least 96 pages. The estimated cost, including printing and distribution, would be not less than $4,000.

On motion by Mr. Fontanna, seconded by Mr. Coulter, the Council unanimously voted that provision should be made in the budget for a directory of members to be published in 1955.

TABLE 3.—COMPARATIVE INCOME, EXPENSE, AND BUDGET FOR FISCAL YEARS 1953 AND 1954 (FISCAL YEAR: DECEMBER 1 THROUGH NOVEMBER 30)

	Actual 1953	Budget 1954
Expense		
JOURNAL OF FORESTRY	$ 38,167.92	$ 40,000.00
Editor's Expense	443.35	500.00
Salaries, Editorial	9,868.40	10,400.00
Salary, Executive Secretary	9,400.00	9,700.00
Salaries, Office	27,470.08	27,950.00
Advertising retainer and commissions	9,065.20	9,480.00
Advertising promotion	2,739.81	1,500.00
Advertising expense	.....	500.00
Travel, officers	2,768.69	3,000.00
Postage	1,818.24	2,200.00
Telephone and Telegram	693.93	800.00
Rent	3,528.00	6,318.00
Multigraph and Mimeograph	376.75	500.00
Miscellaneous Printing	784.45	850.00
Office Supplies	1,150.37	1,500.00
General Expense	1,367.28	1,500.00
Depreciation	494.69	600.00
Retirement Plan	1,063.29	1,475.00
Retirement plan, reserve	300.00	640.00
Affiliation Dues	260.00	160.00
Committee Expense	15.60	50.00
Grading Forestry Schools	366.50	500.00
Council Travel Expense	1,205.49	1,500.00
Division Expense	19.85	50.00
Social Security Tax	575.82	770.00
Section Manual	126.30	50.00
Constitution and Bylaws	518.65	.....
Miscellaneous	74.12	75.00
Referendum	379.21	.....
Election of Officers and Fellows	527.84	.....
	$115,569.93	$122,568.00
Income		
Dues	$ 82,488.98	$ 86,500.00
Fees	1,985.82	2,100.00
Subscriptions and sales of JOURNAL	8,874.48	9,500.00
Advertising	22,916.79	25,000.00
Interest and Dividends	576.88	500.00
Miscellaneous Income	915.33	600.00
	$117,758.28	$124,200.00
Estimated Net Earnings	$ 2,188.35	$ 1,632.00

Elections to Membership

On motion of Dr. Westveld, seconded by Dr. Illick, Joseph E. Ibber-

HAGA-ALTIMETER
Aim at TREETOP and read HEIGHT from scale
PRICE $24 | LEATHER CASE $4 | RANGE-FINDER $14
Write for free booklet
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COMPLETE INVENTORY CRUISING SCALE
Hypsometer
Biltmore Scale
Rigid When Open
Flexible 6-foot Steel Tape $3.00 EACH
Handy Chrome-plated Case 1¾" Dia.
IMMEDIATE DELIVERY
CARL W. GETZ, President
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Lansdale, Pa.

WATER when and where you want it!
with HARODIKES
Portable Canvas Water Tanks
THE ECONOMICAL AND EFFICIENT WAY TO CARRY AND STORE WATER.
ON THE JOB - ON THE SPOT
KEEPING AMERICA GREEN
EXCLUSIVE FEATURES
• Self Supporting • Easily Back-packed
• Ideal for Relay Pumping • Easily Transported
Available in 150 & 300 gallon sizes
A WATER SUPPLY AT THE SCENE OF THE FIRE
Write TODAY for Full Information and Price List
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son of Harrisburg, Pa., was unanimously elected to Junior Membership.

On motion by Dr. Westveld, seconded by Mr. Fontanna, Arthur F. Koller of Manistee, Mich. was unanimously elected to Affiliate Membership.

Ten additional applications for various grades of membership failed of approval because of incomplete information about the applicants, unsatisfactory statements of endorsement, or inadequate experience.

Finances and Budget

An audit report by McGinley and McGinley, certified public accountants, for the first half of the fiscal year (December 1, 1953-May 31, 1954) was reviewed by the Council. Income for the period was $91,290; expense, $58,-648.

Estimated income for the fiscal year is $124,200; estimated expense, $122,-568.

On motion by Mr. Stone, seconded by Mr. Westveld, the budget for the current fiscal year, as shown in Table 3, was unanimously approved.

Office Equipment

Miss L. A. Warren, business manager, reported to the Council on the Society's needs in office equipment, as follows:

An addressograph and automatic feeder attachment for addressing JOURNAL envelopes, dues envelopes, and membership mailings, to replace a machine now fifteen years old.

A postage meter to handle an average of 4,000 to 4,200 pieces of mail monthly.

A mimeograph machine. All mimeographing is done by commercial firms as the Society has never had a machine of its own.

On motion by Dr. Illick, seconded by Mr. Brown, the executive office was unanimously authorized by the Council to acquire new equipment and replace the old as funds became available.

Office Quarters

Prior to February 1954 the Society occupied 1,531 square feet of office space consisting of a 4-room suite and two separate rooms in another section of the Mills Building, Washington, D. C., at an annual rental of $3,528. Back copies of the Society's publications were kept in a downtown warehouse at an annual rental of $360.

Lease on office space at the above rate expired May 1953. Despite substantial rental increases during the period of the Society's lease the building management did not request another lease in 1953, but permitted occupancy of space at the old rate because of a proposed move to larger quarters.

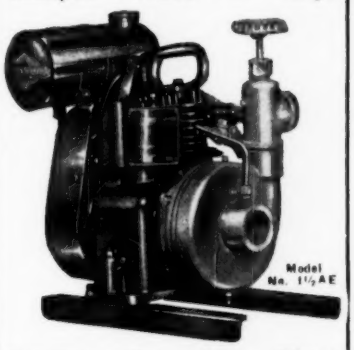
During January 1954 the Mills Building was renovated. Annual rental (including increases made for other tenants during the period of our lease) for the space occupied by the Society at that time was set at $4,146. The downtown storage house also requested an increase of $120. Therefore, annual rental costs would have totaled $4,626.

In February 1954 the Society moved to larger quarters in the Mills Building (2,242 square feet) offering contiguous rooms; shelving for Society publications and supplies; space to grow for some years to come; and a basement storeroom at no additional cost. Annual rental on a two-year lease is $6,318, an additional cost of only $1,692.

S.A.F. Securities

The Constitution provides that funds may be invested only in government securities. At the time of its adoption this provision was not made retroactive. Such stocks and nongovern-

Champion Portable Fire Pumps



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mental bonds as the Society now holds will be sold only as the market reaches the cost price. There is no difficulty in redeeming government bonds through the U. S. Treasury Department when the Council authorizes withdrawal for a specific purpose, but in selling nongovernmental bonds and stocks banks require a certified copy of minutes of a Council meeting at which authorization is granted to the treasurer and/or assistant treasurer to sell securities. A resolution for this purpose was adopted by the previous Council. It was not necessary to use it as the Society did not redeem any nongovernmental bonds or sell any stock. It may not be needed during the term of office of this Council, but in order to have it available in case prompt action is desirable, the following resolution was unanimously approved on motion of Mr. Heacox, seconded by Mr. Nelson.

"Henry Clepper and/or L. Audrey Warren, treasurer and assistant treasurer, respectively, of the Society of American Foresters, are hereby given authority as of this date until January 1, 1956 to sell, as financial need indicates, securities including stocks and bonds held by the Society. Receipts from such sales shall be paid in form of check made to the order of the Society of American Foresters."

The Forester's Manual

According to Arthur B. Meyer, editor of Society publications, all 19 sections (chapters) of *The Foresters' Manual* will have been submitted to the publisher, The Ronald Press Company of New York City, on or before July 1, 1954.

The Society's contract with the company provides for publication of the book in May 1955. It will contain about one thousand printed pages. The selling price of the book cannot be exactly determined until all typescript, tables and figures have been submitted to the publisher and production costs determined.

To date the Council has authorized the withdrawal of $9,500 from the Society's general invested funds for this project, and all has been expended. No additional funds will be appropriated by the Council; incidental costs will be charged against editorial expense and paid from current income. To reimburse the Society, the publisher will pay a royalty of 20 percent of the net sales price of each book. It is expected that the initial printing will be 5,000 copies.

Journal of Forest Science

At the invitation of President Demmon, Dr. Stephen Spurr presented the following proposal to the Council of the Society of American Foresters from the School of Natural Resources, University of Michigan, for the establishment of a scientific journal in the field of forestry.

After two years of investigation, it seems evident that a reasonable need exists for such a journal. The chief sources of articles would be (1) surplus articles of a scientific nature originally submitted to the JOURNAL OF FORESTRY; (2) selected material from schools and experiment stations; (3) scientific articles prepared specifically for the new journal. Subscriptions should number from 500 to 1,000 of which perhaps 70 to 80 percent initially would be library or organization subscriptions.

The size would be restricted by available funds, but individual institutions could well finance separate numbers for special purposes, thus obtaining the use of established distribution channels and the advantages of a serial periodical at a minimum cost.

Cooperating Agencies

The Society of American Foresters, the Division of Research of the U. S. Forest Service, and the School of Natural Resources of the University of Michigan.

Other cooperators should be solicited, in particular the Canadian Institute of Forestry and interested forestry schools.

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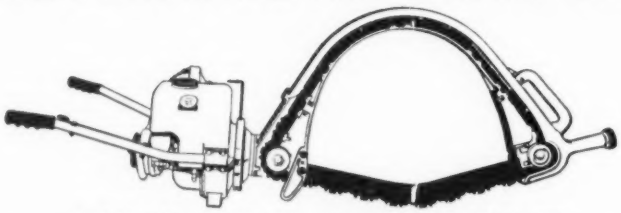

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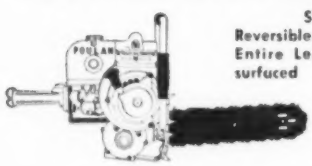

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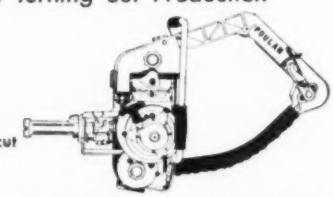

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Cooperators are expected to provide business, editorial, or financial services. In return, individuals belonging to cooperating organizations should receive a special subscription rate to the Journal.

Board of Directors

Each cooperating agency should appoint one man to the board of editors. This board should have the right to determine editorial policy and conduct the business of the journal.

The board should make an annual report to the cooperating organizations and its actions should be subject to their approval.

Society of American Foresters

The Society should solicit subscriptions (perhaps in connection with dues payments) and should maintain the mailing list of the journal. The editors of the Society should aid in coordinating the new journal with existing Society publications.

The Society need make no cash contribution for the printing costs of the new journal. In the long run, however, the Society might well consider taking over the sole sponsorship of the project, assuming sole financial responsibility for it.

Other Cooperators

The Division of Research of the U. S. Forest Service will provide editorial aid and will cooperate financially by taking out a substantial number of subscriptions and by defraying in part some of the printing costs of articles prepared by Forest Service personnel.

The School of Natural Resources will attempt to provide an initial printing fund of $2,000 and will provide the services of an editor and of an editorial assistant on a part-time basis for the first year of operation.

Initiation

The first volume of the new journal should appear in 1955. Subscriptions might well be at $6 for institutions and the general public and at $4 for individuals belonging to cooperating agencies. Assuming an original subscription list of 500, a 64-page type-set quarterly or a 96-page offset quarterly could be put out at the present time on a self-sustaining basis.

On motion of Mr. Hanson, seconded by Mr. Heacox, the Council voted unanimously to support the publication of the proposed journal by contributing business and similar services, but without financial obligation.

Obsolete Policies

On recommendation of the Committee on Policies and Objectives (J. S. Illick, chairman), the Council reviewed two policy statements which because of changing conditions are now out of date.

One policy, adopted by referendum in 1938, had to do with the public acquisition of forest land, and mentions federal and state agencies no longer in existence. The second policy, concerning Indian forests, was adopted as the result of a resolution adopted in annual meeting in 1930. It too is out of date.

On motion by Mr. Stone, seconded by Mr. Heacox, the Council unanimously decided that these statements are outdated and are no longer adequate under present conditions, and shall be declared null and void.

Award of Pinchot and Schlich Medals

By unanimous vote the Council decided to make awards of the Gifford Pinchot Medal and the Sir William Schlich Memorial Medal at the Society's annual dinner in Milwaukee on October 27, 1954. As is customary, the names of the recipients will not be divulged until the presentations are made by President Demmon.

The Gifford Pinchot Medal was given to the Society by Mrs. Pinchot for the Council to award at the golden anniversary meeting in Washington, D. C. December 1950. The first award was made to Henry Solon Graves, in absentia (he was ill at the time). A second award was made at the Montreal meeting in November 1952 to Raphael Zon.

The medal is awarded for outstanding service to the profession of forestry. The Council may award it to someone not a member of the Society or to someone not a professional forester. It was Mrs. Pinchot's expressed wish that the Council have this discretionary authority. The Council may award the medal whenever it so desires, but past Councils thought that the award should not be made oftener than once every two years.

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Today's foresters know the importance of *seed origin* for the success of current and future reforestation programs.

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1. ***CERTIFIED MANINGSEED*** is seed that is collected from and identified by known climatic and elevational zones. Our cone collection areas on the Pacific Coast of Alaska, British Columbia, Washington, Oregon and California have been divided into 25 climatic regions and further sub-divided into 127 climatic zones. Each zone is again divided into 500 foot elevational bands, making it possible for you to match the growing conditions of your planting site with the place of origin of the tree seeds.
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3. ***SELECT (Orchard Grown) MANINGSEED*** is seed that is being grown in our seed orchards. Selection of the best or "plus" trees within several different areas is now being made. Scion material from these "plus" trees is continually being grafted onto root stock in MANINGSEED orchards. Seed produced by these pollen parents will then represent the best genetic selection from natural stands. As the progeny is grown, selection will continue until seed producing only fast growing and well formed trees will result. This select (Orchard Grown) Maningseed will be offered for sale in the very near future.

One of these classes of MANINGSEED will fully meet your needs. Planters who want better forests from better seed should investigate our Scientific Seed Collection Program. Orders for MANINGSEED are booked in September of each year for delivery in November-December—subject of course to availability of crop. May we have your requirements?

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The purpose and history of the Schlich medal were stated by President George Drake in his presentation of the medal at the Montreal meeting in November 1952. (See the JOURNAL for January 1953, page 11.)

The following have been recipients of the medal:

Franklin D. Roosevelt, 1935.
Gifford Pinchot, 1940.
Henry S. Graves, 1944.
William B. Greeley, 1946.
Herman H. Chapman, 1948.
Ralph S. Hosmer, 1950.
Ellwood Wilson, 1952.

Beginning in 1944 the Council has awarded the medal every two years for distinguished service to forestry. However, with the acquisition of the Pinchot medal in 1950, the Council that year, and again in 1952, decided that the Schlich medal could appropriately be awarded in recognition of service to forestry on an international basis.

Resolution on Forest Fire

At the Society Affairs session held during the annual meeting at Colorado Springs on September 15, 1953, a resolution on forest fire, with the signatures of 45 members, was presented for Council consideration.

Because of uncertainty as to the best means of implementing it, the resolution was held over for action by the incoming Council. Meanwhile, it was published in the report of the meeting in the JOURNAL OF FORESTRY for November 1953, page 842.

On motion by Mr. Stone, seconded by Mr. Nelson, the Council voted unanimously to refer the resolution back to the Division of Forest Management, among whose members it originated, for further discussion and clarification, particularly as to item 1.

Lower Michigan Now in Wisconsin-Michigan Section

A majority of the more than 100 members of the Lower Michigan Chapter, who voted by mail ballot on the question of remaining in the Central States Section or transferring to the Wisconsin-Upper Michigan Section, indicated their desire to affiliate with the latter Section.

At the winter meeting of the Wisconsin-Upper Michigan Section, the executive committee decided to send out a questionnaire to the membership to determine whether the affiliation is acceptable. A majority replied that it is.

On motion by Mr. Fontanna, seconded by Mr. Brown, the Council unanimously approved the transfer of members resident in lower Michigan to the Wisconsin-Michigan Section.

Committee on Safety

The Committee on Safety (Seth Jackson, chairman) submitted recommendations to the Council with respect to future activities of the Committee. The following were approved:

1. A brief questionnaire will be sent to all schools of forestry to determine how, and to what extent, instruction in accident prevention is provided.

2. Chairman Jackson will be given time during the Society Affairs session on October 25 in Milwaukee to summarize the results.

3. A proposed bulletin on safety, "Steps in Organizing a Woods Accident Prevention Program," has been prepared for distribution by the Society.

The Council thanked the members of the Committee on Safety for their good work.

Forestry Research Project

President Demmon described the Society's Forestry Research Project now in progress under a grant of $30,000 from the Rockefeller Foundation. In brief, the project is intended to review the progress of research in forestry during the past twenty-five years, to determine the current status of research in America (together with Canada and Mexico), and to indicate the desirable course of research for the future.

He announced that the draft of the report, which will be published late in 1954, has been prepared by Project Director Frank H. Kaufert and Project Forester William H. Cummings. Assistance in the final preparation of the book is being given by S. T. Dana.

Forestry Education Survey

At a meeting of the Council of Forestry School Executives, held in Colorado Springs on September 12, this Council formally requested the Council of the Society to sponsor a study of forestry education as a parallel study to that of forestry research now being conducted by the Society under a grant from the Rockefeller Foundation.

The Council unanimously approved the proposal and authorized the president to appoint a committee to explore possibilities. Subsequently, Hardy L. Shirley and Henry Clepper were asked to comprise the committee.

Mr. Clepper reported that a prospectus for the study, together with

a request for a grant of $80,000 to finance it, has been submitted to one of the large American foundations, where it is now under consideration.

Certificate of Merit

On motion of Mr. Brown, seconded by Mr. Coulter, the Council unanimously authorized a certificate of meritorious service to be presented to each President of the Society on his leaving office.

The executive secretary was instructed to prepare the certificate.

Resolution of Sympathy

On motion by Mr. Nelson, seconded by Dr. Westveld, the Council voted unanimously to present an appropriate resolution of sympathy to the families of deceased members who rendered distinguished service to forestry.

The executive secretary was instructed to prepare the form of resolution.

Miscellaneous

Mr. Stone reported to the Council on the status of legislation affecting O & C Lands in Oregon.

A resolution from the Columbia River Section with respect to the change of the Latin name of Douglas-fir was read. The subject of this resolution will probably be brought up during July at the International Botanical Congress in France, at which the Society is represented officially by Dr. J. S. Boyce and Dr. Lee Hutchins.

The election of Fellows was discussed, but no changes in procedure were made at this time.

Upon unanimous recommendation of the Retirement Committee, the Council approved amendments to the Society's employees' retirement plan.

On behalf of the Council, President Demmon expressed appreciation to Mr. Fontanna and to the University of Michigan for serving as hosts for the meeting, and for the many courtesies received.

Inland Empire Section Meeting Report

The new officers of the Inland Empire Section for the fiscal year 1954-1955 are chairman, George H. Duvendack, St. Joe National Forest, St. Maries, Idaho; vice chairman, Homer J. Hartman, St. Joe National Forest, St. Maries, Idaho; secretary-treasurer, Walter Fields, Potlatch Forests, Inc., Moscow, Idaho.

The new slate of officers was announced at the Section's annual field meeting at Santa, Idaho on May 22, when 65 members together with several visiting Canadian foresters attended a field day devoted to discussion and demonstration of farm forestry problems. The program was under the arrangement of the Section's Small Woodlands Management Committee with C. Douglas Hole, Soil Conservation Service, Lewiston, Idaho, as chairman.

During the morning meeting at the Santa Grange Hall farm forestry problems were presented by a panel moderated by Knut Lunnum, Washington Agricultural Experiment Station, Pullman, Wash. Members of the panel included Carl Dion, farm woodlot owner, Spokane, Wash.; E. L. Williams, Idaho Agricultural Experiment Station, St. Maries; and James H. McKahan, Northwest Timber Company, Coeur d'Alene, Idaho.

The morning meeting was concluded with a short visit to the Tyson Creek

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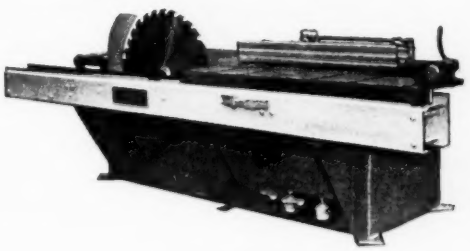

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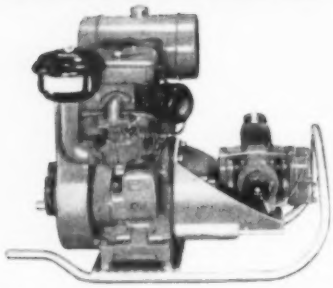

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Dimensions:
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Gallons per minute	40	38	37	36	35	32

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Lumber Company's stud saw mill. Following luncheon by the ladies of the Santa Grange, the group spent the afternoon viewing various farm forestry demonstrations on the C. C. Vanderpoel farm near Santa.

Announcement was made of awards to two Inland Empire Section members, both on the staff of the Inland Empire Research Center, Intermountain Forest and Range Experiment Station, Spokane, Wash. Sharing in the Department of Agriculture distinguished service awards for 1954 was Richard T. Bingham, Section vice chairman, for distinguished work in the field of genetics related to the development of strains of white pine resistant to blister rust. Austin E. Helmers will be detailed to U. S. Army studies in Greenland this summer as a snow specialist because of the results of his snow studies recently completed at the Priest River Experimental Forest in Idaho.

PHILIP C. JOHNSON,
Chairman

Allegheny Section Holds Summer Meeting

The summer meeting of the Allegheny Section was held June 11 and 12 at Mont Alto, Pa. Attendance was in excess of one hundred.

At the opening session in Science Hall of the School of Forestry, Chairman Austin Lentz requested a report on Society Affairs by Henry Clepper. M. K. Goddard, director of the School, and Wilber W. Ward, head of the Mont Alto branch, welcomed the members on behalf of the University.

T. G. Norris, chief of the Division of Nurseries, Pennsylvania Department of Forests and Waters, then led the members on a tour of the Mont Alto nursery.

In the afternoon a conducted field trip was made to plantations established by the School. A project in white pine weevil control was explained by Prof. R. E. Melton. Dr. W. C. Bramble described pruning and thinning operations in red pine. Dr. H. W. Higbee, professor of soil technology, demonstrated conditions in various forest soil types.

On Saturday morning, June 12, the party visited a logging operation in the Mont Alto State Forest. Jack Ewers, assistant district forester, described the timber management plan under which the operation is conducted. A long stop was made at the well-known white pine plantation at Old Forge, established in 1909.

Harry W. Dengler, extension forester of Maryland, demonstrated an explosive device for preventing damage in forest nurseries by birds.

Chairman Lentz announced that the winter meeting would be held in Pittsburgh, Pa. in February 1955.

Northern California Section Holds Spring Meeting

Water-resource planning for California's future and forest practices designed to protect stream flow in the Sierra Nevada were featured topics at the spring field meeting of the Northern California Section, held June 4 and 5 at Shaver Lake, about 60 miles northeast of Fresno.

At the dinner meeting June 4, Medill Thiebaud, of the State Division of Water Resources, described investigations seeking to assure future water supplies for California. Next day the 130 members and guests visited lands of the Southern California Edision Company and the Sierra National Forest to observe cutting operations and recreation uses on protected watersheds.

The June 5 field tour included a 100-acre brushfield reclamation project of the Southern California Edison Company, and improvement work in 40-year-old sugar pine stand being released to capitalize on a growth rate of 3 annual rings per inch.

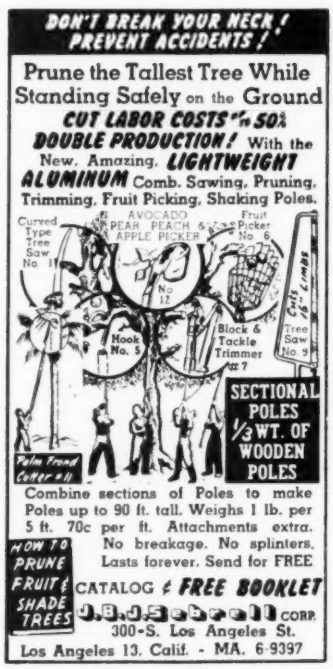
A crew from the Sierra National Forest demonstrated a tractor-mounted chipper used for hazard reduction and erosion control. The machine is rigged to chew up slash and spray an inch-thick mulch of chips on skid trails.

At the sawmill of Byles-Jamison Lumber Company, luncheon ceremonies included presentation of a tree farm certificate to Southern California Edison Company.

At a business meeting the Executive Committee approved affiliation of the Lassen-Almanor Forest Forum with the Section. Also approved was the appointment of Lee Thomas, new supervisor of the Sierra National Forest, as chairman of the Section's Forestry Research Committee.

John Callaghan, deputy state forester at Redding and chairman-elect of the Section, was general chairman of the field meeting. Cecil E. Metcalf, deputy state forester, Fresno, was chairman of the local arrangements committee, assisted by William Wingo, forester for Southern California Edi-

NEW OFFICERS of the Northern California Section attending spring field meeting are left to right Ralph C. Andree, secretary, Redding; John Callaghan, chairman, Redding; and K. M. MacDonald, vice chairman, Woodleaf. Not present was William H. Holmes, treasurer, of Strawberry Valley.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son, Shaver Lake; Dean F. Schlobohm, California Division of Forestry, Fresno; and Clifford E. Risbrudt, Sierra National Forest, Fresno.

Membership Applications and Advancements

Proposals for admission, advancement, and reinstatement received in the Society office during the month of June are listed below.

Action on the eligibility of those proposed for membership as listed below will be taken by the Council as of September 1, 1954. Communications from voting members regarding the membership eligibility of these persons should be received in the Society office prior to that date.

Allegheny Section

Student Grade

PENNSYLVANIA STATE UNIVERSITY
Harper, R. L.
UNIVERSITY OF WEST VIRGINIA
Jorishie, L. K. Neal, J. W.

Junior Grade

Richardson, T. L., 506 Mailler St., Titusville, Pa.; Yale, M.F., 1948. Reinstatement.

Appalachian Section

Junior Grade

Hill, J. D., Service Forester, N. C. Dept. of Cons. & Dev., Rockingham, N. C.; N. C. State College, B.S.F., 1950.

Fishburne, H. B., Owner, Fishburne Land & Tbr. Co., Yonges Island, S. C. (Affiliate, 1948).

St. John, C. H., Field Asst., International Paper Co., Wilmington, N. C.; Univ. of Ga., B.S.F., 1950. Reinstatement.

Member Grade

Hardee, J. H., Forester, Institute of Inter-american Affairs, Santiago, Chile. (Junior, 1947).

Smith, D., Asst. Prof., V. P. I., Blacksburg, Va.; Univ. of Ga., B.S.F., 1947; Duke, M.F., 1950. (Junior, 1947).

Central States Section

Student Grade

UNIVERSITY OF MICHIGAN

Balzer, R. E. Kelly, M. J.
Cody, J. B. Patterson, R. L.
Joye, H. E.

PURDUE UNIVERSITY
Rhoda, C. F.

Columbia River Section

Student Grade

OREGON STATE COLLEGE
Armstrong, L. G.

Junior Grade

Deemer, R. D., Forester, U.S.F.S., Klamath River, Calif.; State Univ. of N. Y., B.S.F., 1950.

Hahn, O. M., Bridge Eng., U.S.F.S., Portland, Ore., Iowa State, B.S.F., 1947.

Wykert, P. V., Forester, Bureau of Land Mgmt., Medford, Ore.; Univ. of Idaho, B.S.F., 1947.

Students Eligible for Automatic Advancement

Asher, J. E. Horton, B. R.
Davidson, D. M. Johnson, V. C.
Deckebach, F. G. Jones, W. L.
Doty, O. H. Miller, R. B.
Duncan, L. E. Mulholland, K.
Ellson, A. C. Pierovich, J. M.
Graham, R. L. Pratt, H. L.
Gunter, L. E. Schaefer, W. F.
Hardman, E. D. Skill, N. T.
Holloter, G. C. Williams, J. C.

Affiliate Grade

Moltke, A. W., Vice Pres., Pilot Rock Lbr. Co., Pilot Rock, Ore.

Gulf States Section

Junior Grade

Haynes, C. O., Forest Tech., International Paper Co., Nacogdoches, Texas; L.S.U., B.S.F., 1951.

Robinson, R. F., Forest Tech., International Paper Co., Nacogdoches, Texas; L.S.U., B.S.F., 1949.

Sigler, C. C., Supt., Calcasieur Paper Co., Elizabeth, La.; L.S.U., B.S.F., 1949. Reinstatement.

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**Self-Priming Portable.

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Affiliate Grade

Ford, C. A., Forest Tech., International Paper Co., Clarksville, Texas; Stephen F. Austin State College, B.S., (Forestry), 1950.

George, W. D., Forest Tech., International Paper Co., Nacogdoches, Texas; Stephen F. Austin State College, B.S., (Forestry), 1953.

Inland Empire Section

Student Grade

UNIVERSITY OF IDAHO
Wallace, W. B.

Kentucky-Tennessee Section

Junior Grade

Pyle, A. W., Forester, Koppers Co., Inc., Lexington, Tenn.; A.P.I., B.S.F., 1952.

Affiliate Grade

Freeman, E. E., Manager, Geo. E. Tomlinson Co., Winchester, Ky.; State Univ. of N. Y., M.A., (Wood Utilization), 1954.

New England Section

Student Grade

YALE UNIVERSITY
Downer, J. D.

Junior Grade

Cole, A. B., Asst. Prof., Univ. of Mass., Amherst, Mass.; Univ. of Mass. B.S.F., 1946; Yale Univ., M.F., 1948.

Knickerbocker, G. C., Asst. Forester, New England Forester Foundation, Newport, N. H.; State Univ. of N. Y., B.S.F., 1952.

Northern California Section

Student Grade

UNIVERSITY OF CALIFORNIA
Wiseman, R. E.

Junior Grade

Henley, R. K., Forester, U.S.F.S., Placerville, Calif.; Colo. A & M, B.S.F., 1950.

Zemke, H. W., Box 731, Springville, Calif.; Univ. of Wash., B.S.F., 1950.

Northern Rocky Mountain Section

Student Grade

MONTANA STATE UNIVERSITY
Gibson, R. S.

Junior Grade

Students Eligible for Automatic Advancement

Barkman, E. C.
Calhoun, D. C.
Dollan, J. M.
Faurot, R. A.
Fowler, F. A.
Graham, D. A.
Hanson, P. C.
Hill, E. B.
Kiser, F. E.
Lowell, J. H.
Stone, G. E.
White, J. H.
Wright, G. G.

Ozark Section

Affiliate Grade

Riley, J. T., Control Aide, Bureau of Ento. & Plant Quar., Sand Springs, Okla.; Okla. A & M, B.S., (Forestry), 1954.

Robinson, D. W., 511 No. 8th St., Henryetta, Okla.; Okla. A & M, B.S., (Forestry), 1952.

Smith, W. H., Dist. Forester, Ark. State Forestry Comm., Perryville, Ark.; Ark. A & M, B.S., (Forestry), 1953.

Wagner, G. J., Forester, International Paper Co., Malvern, Ark.; Okla. A & M, B.S., (Forestry), 1954.

Puget Sound Section

Student Grade

UNIVERSITY OF WASHINGTON
Fredriksen, R. L.

Junior Grade

Stuart, Alice, Public relations, Fairbanks, Alaska; Univ. of Minn., B.S.F., 1933. Reinstatement.

Member Grade

Klotz, A. C., Dist. Mgr., American Forest Prod. Ind., Inc., Tacoma, Wash.; Univ. of Wash., B.S.F., 1941. Reinstatement.

Southeastern Section

Student Grade

UNIVERSITY OF GEORGIA
Patterson, L. R.
ALABAMA POLYTECHNIC INSTITUTE
Meadows, J. C.

Junior Grade

Perdue, W. K., Dist. Forester, International Paper Co., Madison, Ga.; L.S.U., B.S.F., 1942. Reinstatement.

Wilkins, J. C., Field Asst., International Paper Co., Madison, Ga.; Univ. of Ga., B.S.F., 1948. Reinstatement.

Students Eligible for Automatic Advancement

Handy, H.

Affiliate Grade

Bateman, B. J., Field Asst., International Paper Co., Gainesville, Fla.

Upper Mississippi Valley Section

Student Grade

UNIVERSITY OF MINNESOTA
Rosenberg, H. L.

Wisconsin-Upper Michigan Section

Affiliate Grade

Lyons, R. W., Vice Pres., Kimberly-Clark Corp., Neenah, Wisc.; Univ. of Toronto, B.S., (Forestry), 1916; F.E., 1921.

Watson, J. C., Route 1, Box 218, Iron Mountain, Mich.; Mich. College of Mining & Tech., B.S., (Forest Mgmt.), 1954.

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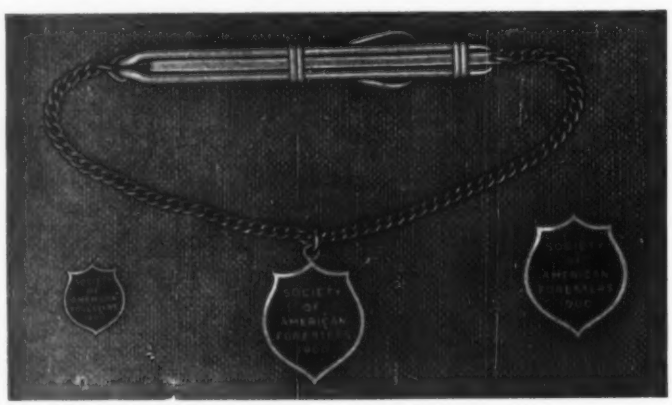

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FISH SEE RED—Biologists at a California fish hatchery have confirmed an opinion long held by experienced sportsmen—that hungry trout prefer red colored food. Faced with the problem of dressing up a new-type pellet fish food for trout "eye-appeal," the hatchery staff experimented with corks of various colors. Blue, yellow, green and white corks were tossed into the trout ponds but the fish were apathetic in their response. When a red cork was tossed in, however, the fish came to life. In fact, by continual strikes, the trout pushed the red cork clear out of the water and on the bank! Fly-tyers might do well to remember this experiment.—Sport Fishing Institute Bulletin.

★ ★ ★

ST. AUGUSTINE, Florida, claims the oldest wooden schoolhouse in the United States, built before the Revolutionary War.

Forestry News

Resources for the Future to Receive Support from Ford Foundation

R. G. Gustavson, president and executive director of Resources for the Future, Inc., has announced that that organization will receive from The Ford Foundation a grant to support a program of research and education for a five-year period at an average annual level of about $750,000. The grant, which takes account of unexpended funds already made available to Resources for the Future, totals $3,410,000 and covers the period ending September 30, 1959. The grant has been formally accepted by the organization's board of directors, of which Horace M. Albright, president of the United States Potash Company, is chairman.

I am glad, Dr. Gustavson said, that The Ford Foundation has expressed its confidence in Resources for the Future, and on a scale that will enable us to make a real start on work that very much needs doing. Some of the problems related to developing and conserving our natural resources already are critical and more may become so as our population grows and our economy continues to thrive. Demands upon our soil and water resources are rising every year, as also are demands on the nonrenewable mineral resources—fuels, metals, and the rest—of our own country and of other lands.

The way in which these issues are met will be of deep concern to everyone in the country. Many of the answers may call for policy-making and action, public or private; these are beyond the scope of Resources for the Future. But in almost every instance finding the best answers will call for more facts and better understanding. There is still much to be learned about our natural resources and how to use them, and about how the many different resource situations are related. Also the knowledge that has already been gained is not always carried fast enough to all the people who need it. Resources for the Future, interested in the whole range of natural resources, will concentrate on research and education. Our aim is to encourage and supplement, not to duplicate, the work already undertaken by well qualified groups and individuals.

As an indication of the kinds of projects his organization will undertake, Dr. Gustavson listed 10 problem areas:

1. The need for continuing, or periodic, studies and appraisals of the past trends, current position, and future outlook for resources development and use.

2. The need for developing the principles and methods for evaluating resource development projects and programs, both public and private, including economic, social and other factors.

3. The role of energy in the economy.

4. Economic and administrative factors in the non-military use of atomic energy.

5. Unemployment and distress in certain areas or industries heavily dependent upon waning or mis-managed natural resources.

6. The role of resources development in regional and national economic development.

7. The need for improving the supply and utilization of forest resources.

8. The administration and management of resource enterprises and programs.

9. Economic and social development in smaller watersheds.

10. The need for encouragement, extension, and improvement of education and training in resources fields, emphasizing especially the social science aspects.

Dr. Gustavson emphasized that these proposed projects are merely examples of important jobs that need doing and that can appropriately be undertaken. In view of budget limitations it is unlikely that "we could take on all of the proposals simultaneously; certainly not at the start when we are in the process of . . . . formulating a definite program. But all ten of the projects, and a number of others like them, are worth effort and attention."

Some of the work of Resources for the Future, according to Dr. Gustavson, will be handled largely by the organization's own staff through such means as preparation of research studies, holding of small conferences and engaging of expert consultants. Other work will be handled almost entirely by grants to qualified institutions or individuals. For some projects, both methods may be used. The grant phase of the program, he added, probably will not average more than $250,000 a year and thus will have to be highly selective.

Northeastern Forest Tree Improvement Conference

The second Northeastern Forest Tree Improvement Conference will be held at Mont Alto, Pa., August 24 and 25. Those attending the conference will be

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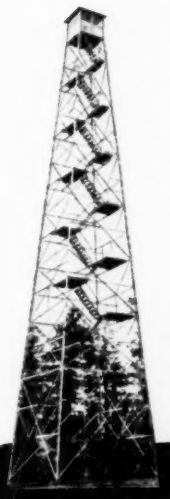

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housed in the dormitory of the Pennsylvania State University School of Forestry. Reservations may be made with Prof. W. W. Ward, director of the Mont Alto branch of the School.

The program chairman of the conference is Dr. Ernst J. Schreiner, forest geneticist of the Northeastern Forest Experiment Station.

The first northeastern conference on forest tree improvement was held in August 1953 at William College, Williamstown, Mass.

National Watershed Congress to be Held

On December 6 and 7 a National Watershed Congress will be held in Washington, D. C. Advance work in preparation for the conference is being carried on by 10 study groups. Subjects to be covered include: elements of a sound national land and water policy; existing and needed federal legislation; existing and needed state legislation for creation of watershed districts; state participation in establishment of adequate state natural resources departments and state participation in local watershed district financing; federal appropriations; federal, state and local cost sharing; principles of federal inter-agency coordination; local administrative techniques; public understanding; organization of watershed associations.

The general committee for the congress consists of Walters S. Davis, chairman, Association of Soil Conservation Districts; Edwin R. Cotton, Interstate Commission on the Potomac River; C. R. Gutermuth, Wildlife Management Institute; and Raymond A. McConnel, Jr., the *Lincoln Journal* (Lincoln, Neb.).

E. L. Demmon Awarded Distinguished Service Medal

At the fortieth anniversary reunion of his class at the University of Michigan, E. L. Demmon, president of the Society of American Foresters, was presented with the University's distinguished alumni service award.

Although the bronze medal was awarded primarily for loyal and purposeful service to the alumni association, the citation also gave recognition to Mr. Demmon's leadership in the forestry profession.

Rockefeller Gift Helps Preserved Giant Sequoia Stand

A $1,000,000 gift from John D. Rockefeller, Jr. to the Save-the-Redwoods League, and through the League to the California State Park Commission, has assured the preservation as a State Park of the impressive primeval forest in the South Calaveras Grove of giant sequoias, it is announced by Governor Goodwin J. Knight, of California.

Chairman Joseph R. Knowland of the California State Park Commission and President Arthur E. Connick of the League told the Governor that Jackson Hole Preserve, Inc., a Rockefeller corporation, had transmitted the gift, to be matched with State funds. The announcement was authorized by Laurance Rockefeller, president of the corporation.

The proposed park contains a thousand of these giant sequoias as well as superlative stands of sugar pine, ponderosa pine and other species. The $1,000,000, together with other gifts of land and money from the federal government and from individuals and organizations through the Save-the-Redwoods League and through the Calaveras Grove Association will, when

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Seal-Tite
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Proved superior in over 8 years of field service
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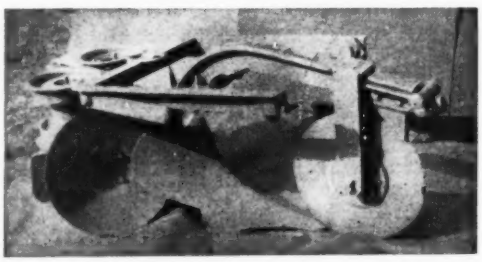

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RANGER PAL JR. FIRE PLOW

The Ranger Pal Junior fire plow is a hand or hydraulic lift middle-buster with coulter and discs. Drawbar connection built of 1" cast steel T-beam. Has 16" coulter roller bearing assembly with grease seal, mounted ahead of 14" tempered steel middle-buster, capable of cutting large underground roots. One 16" harrow disc bearing assembly is mounted on each side and slightly behind the middle-buster wing which turns the sod over and out. Depth of plowed line may be adjusted by either the presence or absence of two spool weights attached on rear of plow. Leaves a 5 foot earth line and can be drawn by any piece of light equipment, Ford type tractor, jeep or power wagon. Built compact and sturdy for ease in handling and reduced maintenance costs. Tested and proven by Louisiana Forestry Commission. Made by makers of Ranger Pal Fire Plow. Not designed to supersede the Ranger Pal but adapted for lighter equipment. Mass production price at $385.00 each, f.o.b. shop. Workmanship guaranteed.

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WEST MONROE LOUISIANA

matched with State funds, make possible the payment of $2,800,000, the price agreed upon for the purchase of 2,155 acres from the Pickering Lumber Corporation of Standard, Calif., and Kansas City, Mo.

Private & Industrial

A. G. T. Moore Retires

A. G. T. Moore of New Orleans, La., since 1915 traffic manager for the Southern Pine Association and former manager of the Association's Department of Conservation, retired June 1.

For many years Mr. Moore was active in the lumber industry in the promotion of improved protection of forests from fire. As early as 1917 he organized a conference on the rehabilitation of cutover lands in the South.

He has been an Associate Member of the S.A.F. since 1937.

Foresters' Employment Service

Keith Cranston, forestry consultant, Leland, Miss., has started an employment service for foresters on a fee basis.

Industrial firms, timberland owners and operators, and other employers may make use of this personnel placement office.

Inquiries and data may be directed to Mr. Cranston with assurance of confidential treatment.

Forest Consulant Firm Offers Loans to Foresters on Timberlands

An announcement received from James M. Vardaman & Co., forest consultants of Laurel, Miss., indicates that firm is now making long-term loans on timberlands. Loans are presently restricted to foresters and range between $500 and $10,000, with a maximum term of 20 years. Interest is payable annually and varies in rate with each borrower and each tract of timber.

Each applicant for a loan must provide the firm with a timber estimate of the property made by "any forester of recognized ability." The amount of money lent on a given tract, after personal inspection by the firm, depends on its appraised value covering the following elements: volume of saw timbers; volume of pulpwood; amount of pine reproduction and advanced growth; the land itself; and the mineral interest, if any.

It is not essential that a tract contain merchantable timber, although desirable. The firm "intends to interfer in no way with the borrower's man-

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stay-mixed formula

in Southern Glo Boundary Marking Paint

Faced with increasing need for a permanent or semi-permanent mark, more and more foresters are depending upon Southern Glo Boundary Marking Paint.

Developed for marking boundaries, its use has been extended to include especially marking of trees where cutting takes place over 2 to 3 years.

It has three features important to the forester. Its highly visible mark lasts as long as it is needed . . . it is convenient and easy to use . . . and it is economical.

Much of its convenience and economy is due to the exclusive Southern Glo stay-mixed formula #7-1020. Because this formula does not settle out, it almost eliminates the waste of time spent in stirring, and the waste of unusable paint.

Produced in consistency for maximum durability, it is ready for application by brush. May be thinned for use in spray gun without great loss of durability. Like all Southern Glo forestry paints, it will not clog your gun.

In Bright (Seeing) Red, Blue, Orange, Yellow, White and Aluminum.

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SOUTHERN GLO IS AVAILABLE ALSO IN READY-MIXED TREE MARKING PAINT AND IN PASTE.

agement of his property; any system of management which is based soundly on good forestry principles is acceptable." A minimum number of periodic inspections of the properties will be made.

Viewed in the light of an experimental undertaking, the firm is interested in determining the demand for such credit.

W. M. Harlow and R. D. Sanders Produce Motion Pictures

Two professional foresters, members of the S.A.F., have had recent successes in the production of commercial motion pictures.

William M. Harlow, a member of the faculty of the College of Forestry, Syracuse, N. Y., has released a new 16 mm. sound film in color, "Insect Catchers of the Bog Jungle," depicting plants that capture living insects. He has also produced "Time Lapse Studies of Growing Trees"; "The Story of Wood" for the Northeastern Lumber Manufacturers Association; and "The Indian Tipi" for the Boy Scouts of America, all 16 mm. sound-color films.

On his retirement two years hence from the College of Forestry, Dr. Harlow plans to devote full time to the production of films on outdoor subjects, including time lapse photography.

Roy Dale Sanders, Rural Route 6, Evrodale, Brainerd, Minn., a visual education technician has specialized in forestry, wildlife, and general conservation photography. One of his most recent sound-color motion pictures, "A Firm Foundation," was made for the Camp Manufacturing Company of Franklin, Va.

Mr. Sanders is believed to be the only technical forester in the country now making motion pictures professionally as a full time occupation.

Southern Forester Available for Writing Assignments

Henry Bull of New Orleans, who retired because of physical disability after twenty years as silviculturist at the Southern Forest Experiment Station, is now available for writing assignments and similar work that he can perform in his home.

A Yale graduate in forestry (1929), Mr. Bull has an impressive list of research publications, not only in silviculture and mensuration, but in general forestry as well. His field experience covers all southern forest types. He is especially well known for his work in thinning, pruning, and stand improvement in pine. One of the early research workers in bottomland hardwoods, he is also well informed about cypress.

Mr. Bull is available to do technical or popular writing for clients, including articles, speeches, or longer productions. In addition he is qualified to make calculations and prepare management plans from field notes.

Readers of the JOURNAL desiring to utilize Mr. Bull's services are invited to write him at his home 1514 Fern Street, New Orleans 18, La.

Seven-Year Growth of Pulp Industry's Forestry Work

A recent report of the American Pulpwood Association, issued by Executive Secretary W. S. Bromley, presents some interesting facts concerning development of that industry's activities since WWII. The report was based on a survey last year of the 171 pulp and paper companies in the United States. These companies operate the 252 mills which consume pulpwood in this country.

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REDUCED . . . 190 Labor Hours to 38 with a Wilton Motor-Powered BRUSH SAW

Patent pending

Tree-man W. S. Rowland cleared 459,800 sq. ft. of 15-ft. California willows from a power-company right-of-way *in 38 hours*, with a WILTON Motor-Powered Brush Saw! He writes of his men's experience with a Wilton, clearing 100% over 2 miles long, 30 ft. wide.

Automatic recoil starter
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Simple centrifugal clutch
3500-4000 r.p.m.
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Shoulder strap distributes weight
2" tubular aluminum shaft with 1/16" thick wall
Entire saw fits in car trunk
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American pulp companies increased their expenditures for forest management work 347 percent and their timber acreage 43 percent between 1945 and 1952, yet only three out of every 26 cords of pulpwood they use at present come from their own forests.

The study shows that these companies paid out $4,000,000 on forest management and research work in 1945, and $14,400,000 in 1952. "The primary cause of the striking increase is the rapid rise in company forestry programs in furnishing technical services to tree farmers and in improving company forests".

In 1945 the industry owned 17,900,000 acres of timberland, but by 1952 this had increased to 25,800,000 acres.

The report attributes America's greatly increased demand for pulp, paper, paperboard, and other wood cellulose products since World War II as a naturally and major cause of the increases in forest management costs and company timber ownership. Americans now use nearly 400 lbs. of paper and related products per person per year.

That has meant that paper mills have had to operate at capacity. To enable them to do so uninterruptedly, companies supplying them with pulp made long-range investments in forest management personnel, equipment, and services to assure steady harvests of the raw material, wood. They also bought additional timberland as another investment to help answer the demand for paper. "Both courses of action have the important effect of stabilizing employment opportunity and security."

Employment of professional foresters increased heavily during the 7-year period. The number of graduate foresters on the 1952 payrolls of the 171 companies in the pulpwood association's study was over 1,500. Of those engaged in forest management alone, the gain was from 263 to 868 during the 7-year period. The increase in nontechnical personnel in forest work was from 2,000 to over 3,200.

Government

Change of Pecos from Primitive to Wilderness Area Under Consideration

The Forest Service is, in accordance with established policy, considering the reclassification of the Pecos Primitive Area on the Sante Fe National Forest, in New Mexico, as a Wilderness Area. The latter classification has more restrictive requirements than the former under the Secretary of Agriculture's Regulation U-1. In connection with the proposal, some adjustments in boundary of the area are suggested as desirable, increasing its size by more than 12 percent and resulting in inclusion of a portion of the Carson National Forest. The Pecos Primitive Area, embracing some 136,640 acres was created in 1933. A six months' period for consideration of its reclassification was set up by the Forest Service in June.

W. H. Horning Honored by Secretary McKay

Walter H. Horning, chief of the Division of Forestry, Bureau of Land Management since 1949, has received a Citation for Distinguished Service from Secretary of the Interior Douglas McKay. The citation is "in recognition of outstanding service in the management and protection of natural resources" and for "his outstanding achievements in the field of forestry." It recounts his work with the National

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Park Service, the CCC, as technical adviser in the drafting and passage of the first sustained-yield act, the Oregon and California Act of 1937, his service as first chief forester of the C & C Revested Lands Administration, and as first regional administrator for the Bureau of Land Management in the Pacific Northwest.

Forest Service R9 Marks 25th Year

This year marks the 25th anniversary of the North Central Region of the Forest Service. The occasion was celebrated by planting the 900,000,000th tree in the Wisconsin woods and dedicating an Anniversary Plantation.

The ceremony was planned for Sunday, July 25, near the town of Three Lakes, Wisconsin, on the Nicolet National Forest. The program included a round of short talks by well-known people in conservation, and a dedication address by Chief of the Forest Service Richard E. McArdle.

Forest Fire Researchers Honored

The Forest Fire Research Unit of the Intermountain Forest and Range Experiment Station received a unit superior service award from the Secretary of Agriculture in June. Established in 1923 by the late Harry T. Gisborne, the Missoula Fire Research Unit is the oldest in the United States. Present members of the unit are: Jack S. Barrows, in charge; George R. Fahnestock; Charles F. Hardy; John H. Dieterich; and Drucilla H. Otterson.

Forest Service Chief R. E. McArdle, acting for the Secretary of Agriculture, presented the award.

In announcing the citation, Director Reed Bailey said it is in recognition of 30 years of outstanding contribution to forest fire control. Perhaps the best known accomplishment of the unit was the development of a fire danger rating system. Another project started by Gisborne and carried on by his successors is the development of numerous low cost instruments required for fire danger measurements.

The Fire Research Unit developed the methods for planning lookout networks. Fuel type mapping principles and techniques widely used in fire planning were worked out. In 1951, a report was published analyzing 36,000 fire reports. It is the most exhaustive and complete study of forest fire control experience ever compiled.

A recent publication of the Research Unit was "Fire Behavior in Northern Rocky Mountain Forests." It is a practical guide book for all fire personnel.

P. H. Logan on Foreign Assignment

Paul H. Logan, chief check scaler and timber sale inspector for the California Region of the Forest Service, left for Pakistan in June to undertake an assignment with the Foreign Technical Assistance Program. He will be on a two year tour of duty under the Foreign Operations Administration in East Pakistan, helping to mechanize timber harvest methods. Logan has been a private logger in Oregon and has been in the Forest Service for 25 years.

Wolf to New Position in General Accounting Office

Robert E. Wolf in March joined the Office of Investigations of the General Accounting Office in Washington, D. C. The position is a new one for that agency.

Wolf was previously employed in the Bureau of the Budget, having come to Washington in 1953 from Russellville, Arkansas, where he was district forester for the Bureau of Land Management.

F. J. Smith Named New Rio Grande Supervisor

Frank J. Smith, assistant head of the regional Division of Range Management in the Denver office of the U. S. Forest Service, will succeed E. A. Snow as supervisor of the Rio Grande National Forest with headquarters in Monte Vista, Colo. Smith is a graduate of Colorado A & M College, School of Forestry and Range Management, and has served with the Forest Service since 1937. In 1945, and 1946, he was a member of the armed forces; after which he served as ranger of the Muddy District on the Grand Mesa National Forest. In 1949, he became assistant supervisor of the Uncompahgre Forest at Delta, and in 1952, was transferred to the Denver regional office in his present position. He is a second generation forester, his father having served many years, prior to his death, with the Forest Service.

E. A. Snow, former supervisor of the Rio Grande Forest recently transferred from Monte Vista to the Denver

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office of the Forest Service as director of the insect control programs in the Division of Timber Management.

W. B. Apgar Retires

William B. Apgar, regional communications officer of the Northern Region of the Forest Service retired on June 30. He first came to the Northern Rocky Mountain Region in 1918 for seasonal employment as a fire guard. He graduated from the School of Forestry, Cornell University, in 1922. Subsequently he held field positions on various Colorado forests and transferred to Nebraska in 1930 in charge of the Bessey Forest Nursery where 2 million seedling trees were grown annually. In 1931, Mr. Apgar returned to Region One where he took charge of the Savenac Forest Nursery at Haugen, Montana. In 1934 he moved to the regional office in Missoula and assumed responsibilities as regional communications officer. During the past twenty years, he has taken a leading part in the development of the region's extensive system of communications.

F. J. Poch Retires; Succeeded by E. W. Schultz

Fritz J. Poch, San Isabel Forest Supervisor at Pueblo, Colo., retired from the U. S. Forest Service on July 1. A graduate of Iowa State College School of Forestry, Poch started his career in the Forest Service as a field assistant in 1917. He served with the U. S. Army Air Service in France during World War I. He became supervisor of the San Isabel in 1935, and served in that capacity until 1942, when he was transferred to the Harney Forest in South Dakota. He returned to the San Isabel in 1944, and served there as supervisor up to the time of his retirement.

Poch will be succeeded by promotion of his assistant, Edward W. Schultz, an Oregon State College, graduate of 1941. Schultz transferred to the San Isabel Forest as assistant supervisor in 1952.

William S. Beckley, ranger of the Boulder District, Roosevelt National Forest, is being promoted and will transfer to Pueblo as Schultz's assistant.

Education

J. W. Duffield Joins Industrial Forestry Association

John W. Duffield resigned his position with the College of Forestry, University of Washington, in June to become geneticist and nursery supervisor for the Industrial Forestry Association. He will be headquartered at Olympia, Wash. Mr. Duffield is associate editor for silviculture on the editorial board of the JOURNAL. Offices of the Association are in Portland.

Penn State University Now Has School of Forestry

By action of the trustees of The Pennsylvania State University, Dr. Milton Eisenhower, president of the institution, has announced that the Department of Forestry was raised to the status of a School of Forestry, effective July 1.

M. K. Goddard, head of the Department, is director of the School, which now contains two departments. Dr. W. C. Bramble is head of the Department of Forest Management, and Dr. N. A. Norton of the Department of Wood Utilization.

Professional forestry instruction at Penn State was started in the fall of 1906.

Michigan State Honors Collingwood and Tinker

G. Harris Collingwood and Earl W. Tinker were honored in June by receipt of the Michigan State College Alumni Award for Distinguished Service "in recognition of preeminent service in advancing human welfare." Both men have had varied careers as professional foresters. Mr. Collingwood is now in the Legislative Reference Service of the Library of Congress; Mr. Tinker is Executive secretary of the American Paper and Pulp Association. They were two of four recipients of awards presented by Dr. John A. Hannah, President of Michigan State and Assistant Secretary of Defense.

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Forestry Employment

S.A.F. members are privileged to insert one 60-word advertisement in this column without charge. Forest industries desiring to employ foresters may insert advertisements at the rate of $4 per column inch. Copy must be received by the end of this month for an advertisement to appear in the issue after next.

Obviously, the Society cannot assume responsibility beyond making it possible for prospective employee and employer to enter into negotiations.

NOTICE TO INDUSTRY

Personnel Placement

A service for industrial firms, foresters, and timbermen—to find the best qualified man for the job. List your openings in forestry and allied fields with me. I can supply information on qualified men. Inquiries handled confidentially.

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Positions Wanted

Forester, 26 married. Graduate, Syracuse, B.S. 1950. Experience: timber marking and estimating fire control, public relations with state agency; forest survey in Northeast. Now employed responsible position in retail lumber business. Desires return to forest management work.
Box B, Journal of Forestry, Mills Building, Washington 6, D. C.

Graduate forester, 35, degree agriculture M.F. 1948, married, 2 children, desires position southern states only, with opportunity for advancement. Main interests teaching and public relations.
Box C, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, M.F., Yale, age 34, wants position with forestry-minded organization in New England. Three years engineering U. S. Navy; 3 years logging engineering in Douglas fir region; 3 years cruising, surveying, and buying stumpage for lumber company in New England. Experienced with aerial photos. Minimum $4800.
Box D, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, B.S.F. 1950, desires change of position. Veteran, 31 years old, married, 2 children. Experience: 4½ years wholesale and retail lumber experience, including training in West Coast lumber and plywood mill operations.
Box E, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester with graduate training in both forestry and ornamental horticulture and landscape design. Experience: 1½ years Forest Service in stand improvement and Forest Survey; 2½ years private and state highway landscaping and construction; married, age 33. Desire to relocate on West Coast or Rocky Mountain area.
Box F, Journal of Forestry, Mills Building, Washington 6, D. C.

W. J. DAMTOFT

W. J. Damtoft Awarded Honorary Doctorate

A degree of Doctor of Forest Science was bestowed upon Walter J. Damtoft, assistant secretary and director of The Champion Paper and Fibre Company's General Woods Department, Canton, N. C., during the 65th annual commencement program at North Carolina State College. A graduate in forestry of Yale University, Mr. Damtoft was with the U. S. Forest Service prior to his association with Champion Paper, dating back to 1920 when he became the firm's chief forester.

Mr. Damtoft was a member of the Council during 1944-47, and was elected a Fellow of the Society in 1951.

Fifty Years of Forestry at Iowa State

The Department of Forestry at Iowa State College, Ames, will observe its fiftieth anniversary next October 15 and 16, with all former students and friends of the department invited to attend.

The event will feature dedication of a memorial to Professor G. B. MacDonald, who headed the department from 1910 to 1948.

DeWitt Nelson, director of the California Department of Natural Resources and vice-president of the S.A.F., will speak at a banquet October 15. Awards also will be presented to a number of former students in recognition of their outstanding service to the forestry profession.

The observance will coincide with Homecoming at the college. Open house at the Forestry Department and other events also are planned.

Forester, B.S.F. 1950, 4 years experience, desires forestry position, preferably in insect control, public relations, tree farm, or nursery work. Presently employed as municipal forester. Will consider all opportunities.
Box G, Journal of Forestry, Mills Building, Washington 6, D. C.

Forester, M.F., Ph.D., in forest soils (degrees from three colleges) desires academic position. Anxious to do personnel counseling work with students. Experience in college teaching, national forest ranger district administration, and forest research. Veteran, age 30, family, top recommendations. Not dissatisfied in present work, but believe I would be of more service as a teacher.
Box H, Journal of Forestry, Mills Building, Washington 6, D. C.

Oregon State Establishes Experiment Station

Oregon State College plans for establishment of a forest experiment station to "better serve Oregon's vast timber industry" have been approved by the State Board of Higher Education.

Organization of the station will permit OSC to expand its program of fundamental research in all phases of forest management and products, college officials reported.

Paul M. Dunn, dean of forestry, will be station director.

A forest research committee of staff members with Dr. G. H. Barnes as chairman will work with him in selecting problems to be studied, conduct of research and publication of findings.

The station will cooperate with the state board of forestry, the Oregon forest products laboratory, which is located on the OSC campus and other public and private forest agencies and companies.

"Tropical Woods" to Be Again Published

The journal *Tropical Woods*, published at the Yale University School of Forestry, is to be published again on a regular basis. At first it will appear semiannually, but Editor William L. Stern hopes that forthcoming articles will justify a larger number of issues.

This publication was founded in 1925 by Samuel J. Record, who served as its editor until his death in 1945. The journal is designed to furnish a suitable publication medium for writings on wood anatomy, tropical woods, and wood plants. It is devoted to the

promotion of forestry in the tropics.

The submission rate will be $1.50 annually or $1.00 per single issue. Further information on subscriptions can be obtained from the Assistant to the Editor, Tropical Woods, 205 Prospect St., New Haven, Conn.

Purdue to Offer Degree in Conservation

Purdue University will offer a course of study leading to the degree of Master of Science in Conservation, effective September 1, according to Dean E. C. Young, of the university's Graduate School. For some time the university has given the degree of Bachelor of Science and also Master of Science in forestry, and the new degree will be available primarily to graduate students under the direction of any of the three sponsoring departments, namely, Agronomy, Biology and Forestry. A permanent three-man committee will represent these three departments and will be appointed by the dean of the Graduate School to work with the major professor concerned and to help in the guidance of the student in order that the candidate may get adequate training in natural resource subjects.

This new option will be open to general agricultural graduates as well as those in social sciences and other schools and departments in the university.

Dr. E. R. Martell is head of the forestry department.

Professional Forestry School at Mississippi State College

A four-year professional forestry curriculum has been approved by the Board of Trustees of Mississippi State College and will begin in September, President Ben Hilbun announced June 22.

The curriculum leading to the B. S. degree in forestry is being set up in the Forestry Department, a part of the School of Agriculture. Prof. Robert T. Clapp is head of the Forestry Department, which heretofore offered service courses in farm forestry for agricultural students, and a preforestry curriculum for students who transferred at the end of two years to a professional school of forestry.

According to Prof. Clapp the College has a staff of six professional foresters now engaged in research and teaching, and he expects to add two more men to round out the new program. "We shall have experts on our

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staff in each of the major fields of silviculture, forest management, forest utilization, and forest economics. With the help of our botany and zoology departments, we shall also be able to cover the fifth major field, which is the protection of forests from fire, diseases, and insects," he said.

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New Chain Saw

A new light-weight chain saw has been announced by Homelite Corporation, Port Chester, New York. Designed for fast cutting, this 22 pound, 3.5. brake horsepower Homelite Model 17 chain saw slices through an 18-inch tree in as little as 18 seconds and fells trees 4 feet or more in diameter.

Features include: automatic clutch, all-angle diaphragm carburetion, positive chain lubrication, quick starting, and weather-proof ignition. Straight blades are available in sizes from 15-36 inches; plunge-cut bow saw attachments, for one or two-man operation, are available in 14 inch and 18 inch sizes.

Chain Reels Available

Chisel and crosscut saw chains are now available to users and dealers in 50-foot reels according to the manufacturer, Oregon Saw Chain Corporation, Portland, Oregon. This new chain package has been designed to meet a growing tendency, among large purchasers, to buy cutting chain in reels rather than cut lengths. The reel provides units of chain between the heavier 100-foot reel and lengths of chain packaged to fit a given make of saw and length of bar and enables the small dealer to offer a greater chain selection with less inventory and investment. It also provides large users of any of Oregon's saw chains nineteen types of chain with a handy chain supply from which they can make up their own cut lengths. Besides easy handling, the new reel stores compactly, and leaves the factory complete with emergency and spare parts kits and filing instructions.

Killing Weeds in Ponds and Lakes

The U. S. Fish and Wildlife Service suggests sodium arsenite for ridding farm ponds, fish hatchery ponds, and small lakes of certain submersed vegetation. Such a control method permits freer use of water and releases organic matter for production of food for fish. Best results are obtained when treatment is made in the spring or early summer.

A water-weed control circular is available from the Chipman Chemical Company, Inc., Bound Brook, N. J., manufacturers of Atlas "A", a chemical sodium-arsenite solution.

First Aid and Snake Bite Kit Available

Poisonous snakes and spiders are found in practically every section of North and South America. The actual number of fatal snake or spider bites on record, however, during the past four years is fortunately small. First aid for snake and spider bite will always remain a necessity for people who work and play out of doors. But the need for first aid kits with no other function than to treat snake or spider bites is not always essential and can be costly.

E. D. Bullard Company, 275 Eighth St., San Francisco 3, has combined their Venex Snake Bite Kit with their Heavy Duty Pocket First Aid Kit providing a compact and sturdy pocket-size combination snake bite and first aid kit, 4½" x 2½" 1¼". This new Combination Ven-Aid kit contains all the necessary supplies to give immediate emergency treatment for minor injuries and complete simplified treatment for snake bite that allows the victim to treat himself with medically approved venom extraction equipment.

The snake bite equipment will not deteriorate; first aid supplies when used may be replaced. Kits are designed to be carried in the pocket or glove compartments of automobiles, trucks, and tractors or on the belt in a canvas carrying case.

Model D widening, ditching and grading six miles of road up to Bill's Butte Fire Lookout Tower. Grader is owned jointly by Oregon Dept. of Forestry and Coos County Forest Protective Assn.

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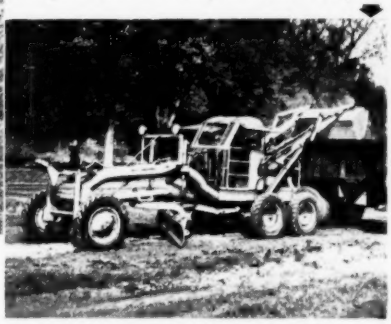
Interchangeable V or blade-type plows, hydraulically controlled, are available for the Model D. Blade also handles light dozing.

This Model D handles loading as well as road maintenance on school forest for Oregon State University, School of Forestry.

With ⅝ cu. yd. rear-mounted, hydraulically controlled bucket, the Model D easily loads any material to trucks, maintains stockpiles.



50 brake hp.—8,800 lb. (bare)—
4 speeds to 25.6 mph., reverse 3.3 mph.

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The new Caterpillar D8 Tractor

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- New, Large Air Cleaner
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- Compact Fuel Injection Equipment
- Double Universal Joint to Protect Clutch and Transmission Bearings

Meet the new D8—boss of the crawlers. Designed and built by Caterpillar, it offers new standards of track-type power, production and value.

With 150 HP available at the drawbar and weighing 38,155 lbs., this rugged unit retains the maneuverability needed in tractor applications. And its new oil clutch provides longer periods between adjustment and replacement than is possible with the conventional dry clutch—a Caterpillar exclusive that means lower maintenance cost and longer life.

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